IN THE HIGH COURT OF THE REPUBLIC OF SINGAPORE

[1999] SGHC 1

Suit 2103/1993

Between

Chua Puay Kiang

… Plaintiff

And

Singapore
Telecommunications Limited

… Defendant

GROUNDS OF DECISION

Copyright — Infringement

Version No 1: 29 Oct 2026 (23:45 hrs)

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Chua Puay Kiang v Singapore Telecommunications Limited and Others

[1999] SGHC 1

Suit 2103/1993
MPH Rubin J
02 January 1999

1 : The action herein concerns memo pagers and revolves around a drawing or a layout of a telephone keyboard (`the drawing`), an accompanying conversion table (`the table`) (see annexures A and B) and an ancillary computer program containing a series of instructions written in a programming language known as `BASIC`, to enable computers to recognise whatever signals generated by pressing the requisite push-buttons on the telephone keyboard and convert those signals into numbers and letters in the English alphabet, as envisaged in the table.

2 It was alleged by the plaintiff that the former Telecommunication Authority of Singapore (`TAS`) who were in the business of providing telecommunication facilities including paging services in Singapore and elsewhere had copied his works. According to him, consequent upon the TAS displaying an interest in his system (the `Teletyper` system`) he demonstrated on 27 February 1988 to the TAS representatives, how his system could transmit alpha-numeric data to or through a pager by anyone using a push-button telephone. The court was told that until October 1988 the first defendants

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(successors of TAS since 1 April 1992) were only able to transmit through their pagers numbers and did not possess the know-how to transmit alphabetical information.

3 It would appear that on or about 11 February 1998, more than a fortnight before the demonstration, the plaintiff had apparently handed to the first defendants` representatives, a version of the drawing and the accompanying table. The plaintiff alleged (paras 13 to 20 of the statement of claim) that in or about July 1989, TAS introduced and provided to telephone subscribers with Radio Memo Service (RMS) pagers, their alpha-numeric push-button input (API) service for text messages and in that process had infringed the plaintiff`s copyright in his drawing, table and the computer program and its function thereof in relation to the TAS`s alpha-numeric push-button input (API) service for text messages and their later skypager service. The plaintiff`s claim against the second defendants was for publishing the plaintiff`s drawing and table in the Singapore telephone directories in 1989 and the third defendants for printing the same.

4 In the event, all three defendants by their joint defence denied that there was any infringement of the plaintiff`s copyright. As regards the meeting which took place on or about 27 February 1988 the first defendants whilst admitting that the plaintiff had demonstrated at the meeting how his system functioned and showed a table and a drawing which were different from the ones set out in the schedule to the statement of claim, denied that the source code or the object code of the plaintiff`s computer program were ever disclosed to the TAS. In particular they averred (para 14 of the defence) that the TAS and/or the first defendants had not copied nor reproduced the table, drawing or any substantial part thereof. They pleaded in the alternative that the API coding table of the

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TAS and/or the first defendants was produced wholly independently of the table and the drawing allegedly prepared by the plaintiff. They contended further that any similarity, if at all, between the API coding table of the TAS and/or the first defendants and the plaintiff`s table lay only in the idea underlying the two tables. As regards the computer program supporting the TAS`s API feature, the first defendants averred (para 17 of the defence) that it was designed, developed and integrated into the RMS software by TAS themselves.

5 As mentioned earlier, the contention of the plaintiff had been that he was the author and creator of the drawing, the table (1BA at p 55) as well as the computer program (1BA 21 to 23) and that the defendants had infringed the plaintiff`s copyright. Insofar as is material the plaintiff`s evidence as appears from paras 4 to 49 of his affidavit of evidence-in-chief could be summarised as follows.

6 Following a casual conversation with a friend sometime in the middle of 1987 as respects shortcomings in the existing telex system, the plaintiff conceived an idea to use the telephone keyboard or keypad to transmit alphabetical messages to printers. The problem, he thought, lay in designing a coding scheme and a telephone keypad layout with letters of the alphabet assigned to the various keys to allow them to be used to key in the desired letters.

7 In the course of his research, he understood that signals which emanated from the depressions of the telephone keyboard buttons are known as DTMF (Dual Tone Multiple Frequency) signals. He then developed an idea of keying in alphabetical messages by using the telephone keypad and his idea was expressed in the table and drawing as appear in the annexure to the statement of claim. In the drawing, all the 26 letters of the English alphabet were

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systematically allocated to the respective numbered keys or buttons `1` to `9`. The bottom row of the telephone keypad comprising three keys were marked `[ast ]`, `0` and `[num ]` and were called base keys.

8 The table contained in the statement of claim was a coding scheme expressing the plaintiff`s methods method of keying in alphabetical and numerical messages to be sent through the telephone. A letter could be keyed in by depressing two keys or buttons in sequence on the telephone keypad. In other words, a letter was keyed in by first pressing a base key (`[ast]`, `0` or `[num]`) and then pressing a `number key` in accordance with the coding in his table. A number could be keyed in by depressing the respective number key alone. However, due to the fact that the `0` key was a base key, the figure `0` was keyed in by depressing the `0` base key twice.

9 He claimed that his table and drawing were user-friendly in that the letters A to Z including the space function key were all assigned in orderly sequence on the numbered keys starting from the key numbered `1` so that the user could easily locate any particular letter to input. It also enabled figures `1` to `9` to be keyed in directly by depressing the `1` to `9` buttons once, since letters A to Z could be generated only after pressing the base key first followed by the assigned letter key. Moreover, if a wrong base key was pressed, the error could be corrected by depressing the correct base key immediately, because depressing two different base keys would not result in any letter or numbers or generate any special function.

10 The plaintiff also developed his own DTMF decoder and put together the hardware which enabled him to use an ordinary push-button telephone to send alphabetical messages to be printed out at a printer. The system required a

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hardware device called EPROM (Erasable (user) Programmable Read Only Memory) to convert DTMF signals into alphabet.

11 He named his invention `Teletyper` and submitted it on or about November 1987 to the organizers of `Inventime 88`. On or about 8 December 1987, he met Mr Leong Yew Kay (Mr Leong) of the TAS who came to the plaintiff`s premises to view one of the plaintiff`s products known as Teleguard. During the meeting Mr Leong showed the plaintiff a memo pager which could display alphabetical messages in addition to numbers. Mr Leong then mentioned to the plaintiff that at that time it was still not possible to use an ordinary push-button telephone to key in the alphabet. Up to that point of time, push-button telephones could only input numbers whereas alphabetical messages could be sent only through telex machines or computers with a modem.

12 Having had the benefit of his research on the teletyper system, the plaintiff did further research to adapt his system to produce alphabetical messages in a memo pager to make the memo pagers more appealing to the public and therefore, saleable by facilitating users to key in alphabetical messages using an ordinary push-button telephone.

13 In or about January 1988, he finalised and reduced into writing the complete table and drawing similar to the one contained in the schedule to the statement of claim. The table and drawing referred to also appeared in a book published by him in or about May 1988. The drawing appearing in the said book was however slightly different from the keypad layout presented at Inventime 88 competition. As a result, the `[ast ]` key currently stood for the `spell` function and the `[num ]` key now represented the `erase` function. These

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changes were made to his earlier keypad layout to suit the functions for memo pagers.

14 Also in or about January 1988, the plaintiff displayed his modified teletyper system adapted for the purposes of the memo pager to the judges of Inventime 88, where he was able to use an ordinary push-button telephone to key in letters which appeared on a memo pager. His teletyper system as a result won the bronze award at Inventime 88.

15 After Inventime 88, the plaintiff invited Mr Leong to view his modified teletyper system and sometime in February 1988, he demonstrated his system to Mr Leong and one Mr Wee at the plaintiff`s showroom at Sim Lim Square and gave them copies of his table and drawing. He was later invited by Mr Leong to give a demonstration of his teletyper system to the TAS officers on 27 February 1988. All those present at the meeting had a copy of the plaintiff`s table and drawing which was previously handed over to Mr Leong.

16 At the demonstration, he explained to those present how his teletyper method worked and sketched on a white-board, a diagram showing the inter-action between the telephone, the DTMF decoder, the personal computer, the radio message service (RMS) control centre and the memo pager. The diagram or flowchart pertaining to his explanation (p 60 of his affidavit) appears as follows:

17 Note this: Graphic = flowchart1.tif

18 He demonstrated how his system worked by displaying a message containing text and numbers provided to him, on a memo pager, by using an ordinary push-button telephone to key in the message. After explaining his table

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containing the keying-in method, he also showed them how to key in numbers `1` to `9` by depressing the keys `1` to `9` once and the number `0` by depressing the `0` key twice although this was not reflected in the table he had provided them with. During the demonstration, the TAS officers present - the group included Mr Leong, Mr Ma Chi Sing, Mr Hair Eng Sung and Mr Ang Tian Sing - were able to observe how he used the base keys in combination with the numbered keys to key in the message to be displayed in the memo pagers in accordance with his table. After the meeting the TAS officers who were keenly following him made him further explain his teletyper system with particular reference to his table and drawing as well as the use of the base keys `[ast ]`, `0` and `[num ]`. Other matters discussed included alternative layouts of the keypad in his drawing, producing a template (a master document for a word processor, spreadsheet or other application used as the starting point) for push-button telephones and technical issues involving the DTMF decoder.

19 After that meeting he did not hear from the TAS. Later, being concerned about the perceived proprietary rights over his teletyper system, he published the details of his teletyper system in a book intituled `Teletyper`, on or about May 1988.

20 He did not hear from TAS further on his teletyper system until he discovered the defendants` API coding table printed in the pamphlets and in the 1989 telephone directories. His subsequent attempts to have a dialogue with the TAS were in vain.

21 He claimed that TAS and/or the first defendants had continued to operate their API service for text messages and for this purpose continued to publish or authorise the publishing of the API coding table in their 1990, 1991, 1992, 1993

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and 1994 telephone directories. On or about 18 December 1991, TAS launched its skypager alpha-numeric service and had published and distributed booklets containing the said API coding table. He believed that TAS had developed their API coding table by substantially reproducing his table in the teletyper system and had thereby infringed his copyright in his table.

MY TABLE	API CODING TABLE		
A	[ast]1	A	[ast]2
B	01	B	02
C	[num]1	C	[num]2
D	[ast]2	D	[ast]3
E	02	E	03
F	[num]2	F	[num]3
G	[ast]3	G	[ast]4
H	03	H	04
I	[num]3	I	[num]4
J	[ast]4	J	[ast]5
K	04	K	05
L	[num]4	L	[num]5
M	[ast]5	M	[ast]6
N	05	N	06
O	[num]5	O	[num]6
P	[ast]6	P	[ast]7
Q	06	Q	01
R	[num]6	R	07
S	[ast]7	S	[num]7
T	07	T	[ast]8
U	[num]7	U	08
V	[ast]8	V	[num]8
W	08	W	[ast]9
X	[num]8	X	09
Y	[ast]9	Y	[num]9
Z	09	Z	[num]1
[lt][gt]OR([gt])	[num]9	SPACE	[ast]1
ERASE	[num][num]	BACK SPACE	[num][num]

SPELL OR RETURN	[ast][ast]	END	[ast][ast]
ZERO	00	0	00
1 TO 9	PRESS 1 To 9	1	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8	8
		9	9
		-	[num]0
			0[ast]
		$	[ast]0
		&	[num][ast]
		%	[ast][num]
		?	0[num]

22 As regards other possible keying-in methods which were known prior to his coming up with his system, paras 42 to 47 of the plaintiff`s affidavit bear reproduction as follows:

> 42 My Table does not represent the only method of keying in both alphabets and numbers using the telephone keypad. I came to know of other methods from the documents disclosed by the first defendants in this Suit.For example, another possible method is described by James Martin in an article exhibited at p 182 of `CPK-1`. This method employs the `1 2 3` keys in a similar way as I employ my `[ast ] 0 [num ]` keys. This method was basically adopted with some variations by Mr Ma Chi Sing on his study paper dated 18 June 1984 (less the appendixes) exhibited at p 186 of `CPK-1` (see para 8.2.3).
>
> 43 A third possible method is described by Mr G A Abbink in his article exhibited at p 200 of `CPK-1`. This method uses only the `[ast ]` and `[num ]` keys in a way similar to mine. The `0` key is not used as a base key. 1 or 2 keys are depressed for alphabets and 3 keys are depressed for numbers. A similar variation was proposed by Mr Then Khoon Lin on 14 August

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1985 in his Internal Memorandum exhibited at p 204 of `CPK-1`.

44 A further possible method is set out in Nah Chin Gek`s Internal Memorandum RARD/02/204 dated 8 May 1984 exhibited at p 208 of `CPK-1`. The `[ast]` and `[num]` keys are used alone or together in combination with the numbered keys to key in alphabets.

45 A fifth possible method is to use `[ast ] 0 [num ]` as the base keys but to assign the alphabets to the numbered keys differently from my table. For example, `A` can be keyed in by depressing the keys `[ast ]1` in sequence. `B` can be keyed in by depressing the keys `[ast ]2`. `C` can be keyed in by pressing the keys `[ast ]3`, and so on. To key in all the 26 alphabets, both the `0` and `[num ]` keys have to be used together with the numbered key in a similar manner.

Comparison Between My Table and the API Coding Table

46 I set out below a detailed side by side comparison between my Table and the API Coding Table:

47 The similarities between the API Table and my Table are as follows:

a All of the English alphabet plus the `space` function (my `space` function is represented by `[lt ][gt ]` or `[gt ]`) in both tables are keyed in by depressing firstly one of the base keys ([ast] 0 [num]) and secondly one of the numbered keys in sequence. This is one of the most important features of my Table. The API Coding table and drawing assigns the alphabets (from A to Y; less QZ) to the numbered keys in a systematic fashion starting from the `2` numbered key, a slight shift from the `1` numbered key as assigned by my Table and Drawing.

b The numbers `1` to `9` are keyed in by depressing the `1` to `9` numbered keys once.

c The number `0` is keyed in by depressing the `0` numbered key twice.

d Depressing the `[num ]` key twice will generate the `backspace` function in the API Coding Table and the `erase` function in my Table. The `backspace` function is just a different name for the `erase` function.

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> 48 I observe that the API Coding Table allows 6 special characters (- . $ & % ?) to be generated by different combinations of any 2 different base keys. Due to that, when a wrong base key is depressed in error by the user, the 3 steps must be taken to rectify it:
>
> a A numbered key must be depressed to generate any alphabet, which will be the wrong alphabet.
>
> b The `[num ]` key must be depressed twice to erase that alphabet.
>
> c The correct base key must then be depressed.
>
> 49 Under my Table, because a combination of 2 different base keys does not generate any special characters or function, when a wrong base key is depressed, the correct base key can be immediately depressed without having to make use of the `erase` key or a `backspace` function.

23 During cross-examination the plaintiff asserted that when he devised his table, he was not aware of the publication `Future Developments in Telecommunications` by James Martin nor had he consulted any literature on keypad designs for alphabets. He also claimed that he designed the keypad without looking at any Singapore telephone directories. He agreed with defendants` counsel that any person who would be designing an alphabet sequence which was to be overlaid above a telephone keypad would set out the 26 letters of the alphabet in its ordinary sequence and not at random (p 123 of the NE). He maintained that TAS had copied his table, drawing and the computer program. In relation to his allegation concerning TAS copying his computer program, he admitted that the TAS officers present at the demonstration on 27 February 1998 did not see his program but all the same they had seen how his program worked. He said: `When I say computer program, it is the system function.` (p 157C-E of the NE).

24 The evidence of the plaintiff`s expert Mr See Yat Tuck, was that none of the systems considered by TAS had used the conversion code of the DTMF

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telephone or keyboard layout in the same manner as the plaintiff`s table and drawing (p 249B of the NE). Mr See`s conclusion and his opinion in the main are well summarised in the plaintiff`s counsel`s submission at paras 30 to 32 and they read as follows:

> 30 Mr See`s conclusion, after analysing the first defendant`s documents, was that [TAS] had surveyed a number of methods from 1984 and could not find a solution for inputting the alpha-numeric characters until 27 February 1988 when the plaintiff`s system (1 BA p 55) was demonstrated to it. Neither the tender exercise nor four years study by teams of engineers and systems analysts provided any system to implement an efficient yet practical input alpha-numeric method using the DTMF telephone (VN 266-269). Yet, when the plaintiff`s method was presented to the first defendant in February 1988, it in fact adopted the method and made an unexplained breakthrough (VN 270B).
>
> 31 Mr See`s opinion was that all three versions of PAPI were copied substantially from the plaintiff`s coding scheme (VN 266). PAPI v1 (2 BA p 503) was a direction reproduction (VN 266F, 278D). PAPI v2 (2 BA p 511) and the third version, API (3 BA p 660) were modified and enhanced versions of PAPI v1 but the structure and manner and expression of all three tables was the same (VN 278). Although the plaintiff`s program was written in BASIC and used a different programming technique to include the tables of code, there was no difference between the end result produced by the first defendant`s assembly program and the plaintiff`s BASIC program in creation of the plaintiff`s Teletyper and the API Coding Table. The language used was not important (VN 380E). The API table was a modified and enhanced version of the Teletyper (VN 291) (1 BA p 55). The only difference is that the Teletyper uses a telephone line, DTMF decoder and speech synthesiser system, while the first defendant`s system uses a direct computer link. That difference was inevitable as the programs were originally written for different purposes. It was only the purpose that is different. The structure used to set up the Tables and the manner of expressing them is the same.
>
> 32 Mr See concluded (VN 292-295) that
>
> (1) The API (3 BA pg 660) is a copy of the Teletyper (1 BA p 55).

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> (2) The plaintiff`s Table is not merely an expression of ideas but is a specific embodiment of particular characters to enable translation of alpha-numeric messages.
>
> (3) The documentation relating to the development of the two PAPI (2 BA p 503, 2 BA p 511) versions and the API Table (3 BA p 606) and computer program show that the first defendant relied upon the plaintiff`s Table.
>
> (4) Although the first defendant was not shown the source code, the evidence is that it was aware of the inner works of the plaintiff`s Table.
>
> (5) Copies of the plaintiff`s Table (1 BA p 55) with the conversion code which showed the flow diagram of his system were provided to TAS at the demonstration meeting.
>
> (6) The structure of the plaintiff`s program and the API program is basically the same.
>
> (7) The information imparted to the first defendant was sufficient, as evidenced by the program changes and program documentation, for the defendants to be able to adopt the plaintiff`s structure set up to establish the API table. Mr See`s opinion was that an experienced systems analyst and programmer does not need to see the source code and can copy technique or program function (VN 350B).
>
> (8) The table DTMF 2ASC in the first defendant`s program reproduced substantially the whole of the plaintiff`s Table used in his program in PAPI v1 (1 BA p 503) and a substantial part of that Table in PAPI v3 (API) (3 BA p 606).
>
> Mr See also concluded (at VN 303) that the routes taken by both programs in converting codes are different but that the input devices are the same. The end result is that both programs are using the same input device, the same output device and the same table structure, and that therefore their functions are the same (VN 334B). The structure of the program is main logic, its main function (VN 337-338).

25 During cross-examination Mr See said that insofar as the base or control keys were concerned, the number of choices for control keys was indeed limited (p 390 NE).

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26 The events preceding and the relevant facts surrounding the dispute at hand, as highlighted by counsel for the defendants in their submissions, are as follows.

27 On 3 March 1984, the Telecommunications Authority of Singapore (TAS) held an internal meeting to consider improving its `103` directory service. A study group was set up to consider various automated solutions. These included `Pseudo alphabet access via push-button telephones`.

28 On 5 March 1984, the chairman of the meeting on 3 March 1984, Mr Lim Toon, proposed a possible solution for the study group`s consideration. He suggested the use of `pseudo-alphabets` as engraved on Dual Tone Multi Frequency (DTMF) telephone keyboards with `[ast] , 0, [num]` as base keys in the following manner:

[ast]1	[equals]	A
01	[equals]	B
[num]1	[equals]	C
[ast]2	[equals]	D

and so on.

29 On 29 March 1984, Mr Lim Toon sought the internal views of TAS on the adoption of a national standard for the association of letters to digits on push-button telephone keypads. On 18 June 1984, the study group appointed at the meeting of 3 March 1984 came up with their study paper. The proposal was to use an Automatic Directory Information Service (ADIS) as a short to medium term solution to the `103` problem. In this regard, buttons `1`, `2` and `3` were designated as base keys. The letters `ABC` commenced from button `2`. The letters `- QZ` were located on button `1`.

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30 On 13 July 1984, TAS issued a tender for, inter alia, the design, manufacture and supply of an alpha numeric paging system (ANPS). A proposal stated in the tender was to use `[ast ]2` to denote the letter `A` and `[ast ][ast ]` for end of message. On 14 August 1984, an internal TAS memorandum was sent by Mr Then Koon Lin to Mr Ho Siaw Hong. Mr Then indicated his interest in the transmission of text messages using DTMF push button telephones. Enclosed with the memorandum was a typical DTMF key combination with a drawing of a telephone keypad and a conversion table. The table used the `[ast ]` and `[num ]` as base keys to produce the letters of the alphabet, viz:

[ast]1	[equals]	A
01	[equals]	B
[num]1	[equals]	C
[ast]2	[equals]	D

and so on.

31 On or about 11 February 1988, the plaintiff gave copies of his drawing and table to a TAS officer. These were different from the drawing and table annexed to the statement of claim.

32 On 27 February 1988, the plaintiff gave a demonstration of his system to some officials of TAS. Among other things, he sent an alpha-numeric message from his computer to a pr he had borrowed, via a DTMF push button telephone. However, the plaintiff did not disclose the source code of his computer program to any TAS officer at the meeting. It is common ground that source codes of the plaintiff`s program and the first defendants` program were only exchanged after this action had been commenced for the purposes of comparison by experts.

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33 According to the first defendants there were, however, some shortcomings in the plaintiff`s system. Firstly, there was no Caller Line Identification (CLI). CLI was the facility to enable TAS to check the telephone number of the caller. This was necessary for billing purposes and to trace nuisance calls. Secondly, the plaintiff`s computer could not check on the validity of the number paged. The result was that a caller would never know whether he had paged a valid or invalid pager number.

34 Because of feedback from the marketing department of TAS, that there was a demand from the public for such a service, officers from TAS Mr Ang Dian Seng and Mr Hair Eng Sung, made some studies to see if they could develop their existing software further in this regard. For this purpose, they reviewed previous work done by other TAS officers on similar projects. This included, inter alia, the ADIS and the ANPS referred to above.

35 On 2 March 1988, the plaintiff wrote to the first defendants with some proposals to solve the problems highlighted at the meeting. However, they were found to be unsuitable. On 18 April 1988, Mr Ang and Mr Hair produced a paper entitled `Radio Memo Service - Pseudo Alpha-Numeric Push-Button Input (PAPI)`. In brief, the paper concluded that the first defendants` computer program could be modified to support the feature of sending alpha-numeric messages to pagers using DTMF push button telephones. This paper also included a drawing of a telephone keypad and a conversion table.

36 Subsequent alterations were made to the drawing and the conversion table produced in the 18 April 1988 paper. Corresponding modifications were also made to the first defendants` computer program. In July 1988, the first defendants came up with the API coding table which appeared in the 1988

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Business Telephone Directory. It was this API coding table which is the subject of this suit. There had never been any drawing of a telephone keypad produced in the telephone directory.

37 On 15 October 1988, TAS introduced the API services to users of its alphanumeric pagers. Sometime in the later half of 1989, the plaintiff wrote to his MP. On 21 September 1991, the first defendants replied to the plaintiff setting out the history as to how they came to meet him and what happened between them.

38 On 21 January 1990, the plaintiff wrote to his MP again about his complaints against the first defendants. On 9 March 1990, the first defendants replied and informed the plaintiff that the `[ast ], 0` and `[num ]` base-keys had been `deliberated upon, as early as in 1984, by [TAS] personnel`.

39 On 1 April 1990, the plaintiff again wrote to his MP with a list of queries. On 18 July 1990, the first defendants gave their substantive reply. In this very detailed letter, the first defendants set out the differences between the systems, the history of the research undrtaken by the TAS, referred to work done by `James Martin` and why they could not carry on with the API service in 1984. The letter ended with an offer to meet the plaintiff to discuss any further queries he might have.

40 On 22 July 1990, the plaintiff wrote back to his MP for the fourth time. He said, inter alia, that the 5th and 6th points in his letter of 1 April 1990 had not been answered. On 20 August 1990, the first defendants wrote back and offered to meet the plaintiff to talk the matter over. A meeting was held on 15 September 1990. On 31 October 1990, the first defendants wrote to the plaintiff

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and reiterated, inter alia, that the alphanumeric push-button input technology was available at the Radio Memo Service (RMS) exchange in several code combination systems even before the plaintiff met the TAS officers on 27 February 1988.

41 The defendants called altogether six witnesses: Mr Ma Chi Sing, Mr Ang Dian Seng, Mr Ho Siaw Hong, Mr Hair Eng Sung, Mr Lim Toon and their expert, Mr Goh Tiong Hwee. Mr Leong who had featured in the meetings with the plaintiff in the course of February 1988 was not called. Insofar as material the evidence of the various witnesses for the defendants was as follows.

42 Mr Ma, currently a deputy director in the software development and maintenance department in one of the subsidiaries of the first defendants said that at a meeting held on 3 March 1984 chaired by Mr Lim Toon, they discussed ways and means of improving the telephone directory information service - `103` service - operated by the TAS. The problem was that the number of `103` calls had been increasing over the years and as a result the telephone operators would also have to be increased substantially in order to maintain good telephone directory assistance service to the subscribers.

43 At the meeting, various solutions were suggested to try to solve this problem. One amongst them was to have in place a `pseudo-alphabet` input via push-button telephones to make the directory enquiry directly. At the meeting, Mr Ma was asked to head a group to look into the prospect for an automatic directory information service (ADIS) that was, to provide the `103` service without using manual operators.

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44 On 5 March 1984, Mr Lim Toon sent the members of the study group a memorandum, proposing the use of the keys `[ast ]`, `0` and `[num ]` as base keys for inputting the letters of the alphabet. The said memorandum and its attachment read as follows:

> *...*
>
> *5 March 1984*
>
> *Mr Ma Chi Sing*
>
> *Mrs Law Wei Ying*
>
> *Miss Ong Siok Boon*
>
> *Mr Ong Gee Chiang*
>
> *`103` SERVICE*
>
> *Further to our discussion on 3 March 1984, perhaps another alternative (based on Mr Ma`s idea) can be considered to supplement or to replace voice recognition. This alternative uses the `pseudo-alphabets` (sic) as sometimes engraved on the DTMF pad, in combination with [ast] and [num] symbols, as follows:*

[ast] 1	[equals]	A	)	
			)	
01	[equals]	B	)	
			)	The physical layout on the pad inscription [ast] should make it easy for user so that no memorising is necessary.
			)	
[num] 1	[equals]	C	)	
			)	
[ast] 2	[equals]	D	)	

> *and so on*

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> *[ast] PS: the alphabets (sic) layout of DTMF pad should be made easily available in addition to inscription on phones.*
>
> *The procedural sequence is attached. For your consideration please. Perhaps Mrs Law could include this in the minutes as an `after-note`.*
>
> *(signed)*
>
> *LIM TOON, RT*
>
> *...*

45 Note this: Graphic = flowchart2.tif

46 A number of discussions followed and at the end the group came up with a report on 18 June 1984 entitled `Automatic Directory Information Service`. In that report the group adopted `1`, `2` and `3` (the top three keys on a telephone key base) as base keys for inputting letters of the alphabet. Mr Ma claimed that that study group did not adopt the suggestion of Mr Lim Toon because Mr Ma was heavily influenced by James Martin`s book `Future Development in Telecommunication`. In this book the author had suggested designating a key together with the keys `1`, `2` and `3` as base keys from a telephone keypad to represent each letter of the alphabet. This was `Alpha Digit Alpha Digit` (ADAD). This method required the caller first to press the key where the letter of the alphabet was located. It was only after that step that the corresponding key was pressed. Thus, to get letter `A`, one would press key 2 followed by key 1 and so on. The figure `2` would signify one of the letters `A`, `B` or `C`. `1` would mean that the letter on the left was desired, ie `A`. In short, this was the opposite of the Digit Alphabet Digit Alphabet (DADA) mentioned above.

47 The template suggested in the group`s ADIS report was taken from James Martin`s book which is as follows:

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	Letter 1		Letter 2		Letter 3		
	-QZ	ABC	DEF				
	1		2		3		New Number
	GHI		JKL		MNO		
	4		5		6		Name
	PRS		TUV		WXY		
	7		8		9		Government
	ERASE		REPEAT		END		
	0		[ast]		[num]		
	DIGIT						
	Automatic Directory Information Service						

48 Mr Ma added that after 18 June 1984, members of the study group started to write technical specifications for the ADIS. By October 1986, the technical specifications had been completed and were discussed by another group headed by Mr Lim Toon. According to Mr Ma, he was present at the demonstration on 27 February 1988 where the plaintiff showed how to send alpha-numeric messages to an RMS pager. The plaintiff did not bring his computer nor any computer program for the demonstration. The demonstration involved keying in the message on the telephone keys which was received on a pager.

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49 Insofar as is material, the evidence of Mr Ang Dian Seng, a software engineer attached to the Software Development and Maintenance Department of Singapore Telecom Mobile Link Pte Ltd, a subsidiary of the first defendants, one of the persons involved in the design of the first defendants` API method, was as follows.

50 He was present at the demonstration on 27 February 1988 when the plaintiff made a brief presentation as to how to send alpha-numeric messages using the DTMF telephone. The plaintiff did not at that demonstration show the source code or object code of his computer program to anyone. At the demonstration, the plaintiff borrowed a pager from one of the TAS staff present and used the telephone in the demonstration room. He picked up the telephone receiver, dialled a number and inputted a message. The message then appeared on the pager. The TAS officers present immediately noted a major drawback: they could not get the calling line identification (CLI). CLI was necessary for the TAS to bill the caller as well as to trace nuisance calls. This limitation put paid to the plaintiff`s system and therefore was found unsuitable for application by the staff present at the demonstration. This was made known to the plaintiff who indicated that he would make a further study of the above shortcoming.

51 Another shortcoming discovered by the TAS staff, subsequent to the demonstration was that the plaintiff`s system used a personal computer to receive messages from the caller. The computer would then perform a `store and forward` function in relaying the messages to the alpha-numeric pager and by this method the paging caller would never know whether he had called a valid or invalid pager number.

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52 Owing to certain feedback from the Radio Services Marketing Department, Mr Ang subsequently discussed the matter with Mr Hair Eng Sung and started looking up files dating from 1984 and examined the research and design previously done internally on the same or similar projects. Such projects included the ANPS and the Automatic Directory Information Service (ADIS). In this connection, Mr Ang said that he studied the following input/coding methods:

53 a The `1 2 3` base-keys coding method as stated in James Martin`s book `Future Development in Telecommunications` (2nd Ed) Prentice-Hall Inc 1977 (3BA 185 to 188);

54 b The `[ast ] 0 [num ]` base-keys coding method suggested by Mr Lim Toon in his memo RT/T6/01 dated 5 March 1984 (3BA 702);

55 c The `1 2 3` base-keys input method proposed by Mr Ma Chi Sing in his study paper dated 18 June 1984 on ADIS for the `103` service (3BA 705); and

56 d The PADIT (Pseudo Alphabet DTMF Input Terminal) requirements and the coding method as described in Tender document PT/133/84(Y) (3BA 828 to 831);

57 Mr Ang added that although he had seen the plaintiff`s coding method, he did not however rely on it in the course of developing the Alpha-Numeric Push-button Input (API) base key method.

58 The basic design considerations for API, set by Mr Hair Eng Sung and himself (Mr Ang) before he started his design were:

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59 a to develop a convenient message input method for the callers;

60 b the calling procedure should be consistent with the existing calling procedure; and

61 c the API feature should easily be incorporated into the hardware and the software structure of the RMS.

62 After Mr Ang had studied the various input methods, he discussed them with Mr Hair Eng Sung and they came to the conclusion that two choices of base keys were possible: `1 2 3` and `[ast ] 0 [num ]`. `1 2 3` were the uppermost keys on the push button telephone while `[ast ] 0 [num ]` were the lowermost keys on the push button telephone. They had by then decided to limit each letter to 2 keys as it would reduce the time required for making such paging calls. Based on these two choices of base keys, he did some design studies and finally adopted the coding method using the lowermost keys of the telephone `[ast ] 0 [num ]` as base-keys.

63 Once Mr Ang had decided on the base key, the next step involved the computer program. He did this in about March 1988. By this time, he had already studied the DTMF program well when he was testing the ANPS supplied by FOLEC, one of the tenderers to TAS earlier. He then modified the DTMF program which was part of the telephone interface program in the ANPS to include the coding table for supporting the API feature. During the tests, he made a number of modifications to the program. One was to allow callers using payphones and coinafons to input a message length of up to 25 characters instead of 10 characters without additional charge. This was to enable such callers to be able to input a meaningful API message.

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64 During this time, in conjunction with the modifications to the computer program made by him, Mr Hair Eng Sung was involved in the drawing of the API Coding Table. Three sets of tables and drawings of a telephone template with the letters of alphabet were ultimately produced at different times. The last table became the final version of the API coding table.

65 On 18 April 1988, Mr Hair Eng Sung and he (Mr Ang) came with a paper on the RMS entitled `Pseudo Alpha-Numeric Push-Button Input (PAPI)`. It was Mr Hair who was primarily responsible for preparing the paper. Mr Ang only contributed to the design aspect and the user`s calling procedure in relation to it.

66 The final alphabet layout on the telephone keypad adopted was the same as that of Mr Ma Chi Sing`s recommendation in his study paper of 18 June 1984. This was because it was closer to most telephone sets available in the market that had letters inscribed on the telephone keypad. Mr Hair and Mr Ang also added some additional symbols such as `%, $, &, -` etc for the convenience of the callers since Mr Ang believed that these were the more commonly used symbols.

67 On 15 October 1988, this service was offered to the public on a trial basis for one year. Subsequently, it was offered to the public without additional subscription fee. Mr Ang added that the plaintiff at no time showed nor explained to the TAS officers how the message was sent to the ANPS through his computer program.

68 Mr Ang pointed out the following differences between the API of TAS and the program of the plaintiff:

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69 a TAS` API allowed the paging caller to call the pager number directly while the plaintiff`s program required a two-step dialling;

70 b TAS`s API had no voice response while the plaintiff`s program had the voice response;

71 c The letters of the alphabet were positioned differently in TAS` API and the plaintiff`s program;

72 d TAS` API is available on the RMS exchange while the plaintiff`s program was only available on a stand-alone PC;

73 e TAS` API had CLI while the plaintiff`s program did not have that feature; and

74 f TAS` API could assure the paging caller that the pager number which he had called was valid or not invalid or disconnected once communication between the parties were established, while the plaintiff`s program could not provide such assurance because it performed a `store and forward` function in relaying the message to the pager.

75 Mr Ang denied that he had copied the plaintiff`s computer program or infringed any alleged copyright in the plaintiff`s computer program in any way when he made the necessary modifications to the computer program supplied by FOLEC and Motorola Inc to incorporate the service of sending Alpha-numeric messages to pagers via a DTMF telephone. He reiterated that he had never seen the source code and/or the object code of the plaintiff`s computer program. All he knew about the plaintiff`s computer program was that it could apparently send Alpha-numeric messages to pagers via a DTMF telephone

using the codes in his drawing and table. He said that there were many ways of designing a computer program to achieve such an idea. He underscored the aspect that the plaintiff`s computer program and that of the defendants` worked differently.

76 The next significant witness for the defendants was Mr Hair Eng Sung, an engineer with Singapore Telecom Page Link Pte Ltd, a subsidiary of the first defendants and the officer-in-charge of its Radio Paging Base Statistics Operations and Maintenance. The highlights of his evidence were as follows.

77 Mr Hair first became involved with the Alpha Numeric Paging System (ANPS) or Radio Memo Service (RMS) in September 1985. He said that although TAS had implemented the ANPS system which was commissioned into service on or about 15 April 1987, a number of technical problems remained to be sorted out. He conceded that the system which was in place did not have the feature for sending alphabet messages through a DTMF telephone. He did not consider developing this feature at that time as he was busy assisting in the implementation of another new paging system and was also trying to fine-tune the ANPS system. Prior to 27 February 1988, there was also no feedback from their Radio Services Marketing Department of an urgent requirement to provide the function to send alpha-numeric messages through DTMF telephones.

78 Consequent upon an internal memorandum from Mr Leong dated 20 February 1988, he attended a demonstration given by the plaintiff at TAS premises at Comcentre on 27 February 1988. His evidence in this connection was by and large in consonance with that of Mr Ang and needs no repetition.

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79 Mr Hair confirmed that on 18 April 1988, he and Mr Ang produced a paper entitled `Radio Memo Service - Pseudo Alpha-Numeric Push-Button Input (PAPI).` This paper was targeted at TAS`s marketing department and its objective was to confirm that the ANPS software could be modified to support the feature of sending alpha-numeric messages to RMS pagers using DTMF telephones. It was also to recommend that the said feature be provided to all telephone subscribers and public telephones.

80 In para 3.2(a) of the said paper the following passage appears:

> *A coding method which is a modified version to what has been demonstrated by Photo Electronic Research Centre (the plaintiff) was adopted. In this method, every push-button key is designated with 3 alphabets or special characters/functions. The selection of the 1 out of 3 characters/functions is performed by first selecting any one key from `[ast ]`, `0`, `[num ]` at the bottom row of a keypad which determines the column of the 1 of 3 designated character/function and then followed by the actual character/function key. Two key strokes would be required for a character/function input and one keystroke for a numeric input except digit `0` which requires pressing the `0` key twice`.*

81 Mr Hair claimed that his reason for referring to the plaintiff`s method in his paper was to give the marketing department some idea of the functions and purposes of the PAPI coding system since the plaintiff had provided a point of reference which was familiar to them as they were all present at the demonstration of the plaintiff`s system. He reiterated that his reference to the plaintiff`s method did not mean that the defendants had taken the plaintiff`s method and modified it.

i	`space`	([ast]1)
ii	`-`	([num]0)
iii	`.`	(0[ast])
iv	`$	([ast]0)
v	`&`	([num][ast])
vi	`%`	([ast][num]); and

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vii	`?`	(0[num])

82 Mr Hair`s averments as regards the comparison between the plaintiff`s table and drawing and the first defendants` API coding table and drawing as stated in paras 34 and 36 of his affidavit of evidence-in-chief, were as follows:

> 34 I now turn to a comparison between the plaintiff`s table and the API coding table. Firstly, I believe that no one in the first defendants` employ had seen the plaintiff`s table as annexed to the statement of claim until the commencement of these proceedings. I have already explained in para 10 above that the plaintiff`s coding table and keypad layout we saw at the demonstration is different from that annexed to the statement of claim. It should be noted that there are quite a number of differences between the plaintiff`s table annexed to the statement of claim and that shown at the demonstration on 27 February 1988. These are as follows:
>
> a There is no code for numbers in the plaintiff`s table shown at the demonstration apart from the number `0`;
>
> b The plaintiff`s table shown at the demonstration has code `[num]9` for `[gt]` while the one annexed to the statement of claim has code `[num]9` for `[lt][gt]`; and
>
> c The plaintiff`s table shown at the demonstration has code `[num][num]` for ([lt ]) while the one annexed to the statement of claim has code `[num][num]` to mean `erase`.
>
> 35 Comparing the plaintiff`s table annexed to the statement of claim and the API coding table, the following differences can be observed:
>
> a All the codes for obtaining the various alphabets are different. For example, the code in the plaintiff`s table to obtain `A` is `[ast]1` while it is `[ast]2` in the API coding table;
>
> b The API coding table has the following additional characters which are absent from the plaintiff`s table. These are:
>
> c As for `[ast ][ast ]`, it means `end` text in the API coding table but `Spell or return` in the plaintiff`s table; and

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> d The API coding table also has a title for each of the alphabets/numbers/characters and codes which the plaintiff`s table does not.
>
> 36 As regards the plaintiff`s drawing, again, I believe that no one in the first defendants` employ had ever seen the plaintiff`s drawing annexed to the statement of claim until the commencement of these proceedings. I can see no resemblance between the plaintiff`s drawing and the API coding table. Furthermore, there are also differences between the plaintiff`s drawing annexed to the statement of claim and that shown at the demonstration, namely the characters [lt ][gt ] and [gt ] over key 9, and `back` and `erase` over key `[num]`.

83 In sum, Mr Hair denied that the first defendants had copied the plaintiff`s drawing or table.

84 The evidence of Mr Lim Toon, the Executive Vice-President (International Service) of the first defendants was that on 3 March 1984 - nearly four years before the plaintiff`s demonstration - he chaired a meeting of some TAS officers to review the existing `103` (directory services) traffic situation. A study group headed by Mr Ma was appointed at the meeting and the role of the study group was to look into possible methods for an automatic directory information service (ADIS) to provide the directory information service without using operations and to prepare tender specifications for such methods.

85 Consequently, on 5 March 1984, Mr Lim Toon sent the study group an internal memorandum. In his memorandum, he suggested that they consider a `pseudo-alphabet` method for a caller to input the name of the person whose telephone number he wanted. This was to use the 12 buttons on a DTMF telephone keypad (comprising the numbers 1 to 0 and the keys [ast] and [num]) in different combinations to produce the various letters of the alphabet. It was merely an idea and he left it to Mr Ma and his team to consider it as they thought fit.

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86 According to Mr Lim Toon, based on the method illustrated in his memorandum dated 5 March 1984, the complete table with a standardised pad would logically be as follows:

[ast]1	[equ als]	A		01	[equ als]	B		[nu m]1	[equ als]	C
[ast]2	[equ als]	D	0 2	[equ als]	E	[nu m]2	[equ als]	F		
[ast]3	[equ als]	G	0 3	[equ als]	H	[nu m]3	[equ als]	I		
[ast]4	[equ als]	J	0 4	[equ als]	K	[nu m]4	[equ als]	L		
[ast]5	[equ als]	M	0 5	[equ als]	N	[nu m]5	[equ als]	O		
[ast]6	[equ als]	P	0 6	[equ als]	Q	[nu m]6	[equ als]	R		
7	[equ als]	S	0 7	[equ als]	T	[nu m]7	[equ als]	U		
[ast]8	[equ als]	V	0 8	[equ als]	W	[nu m]8	[equ als]	X		
[ast]9	[equ als]	Y	0 9	[equ als]	Z					

87 Mr Lim Toon had envisaged that the alphabet layout would be displayed on the push-button telephone keypad so as to make it easy for users as there is no need for them to memorise the layout. He had no prior research precedents or examples when he came up with this idea: It was a relatively simple concept.

88 Mr Lim Toon attached a procedure for inputting the letters of the alphabet together with his memorandum. In it, he also suggested that `space` be denoted by `[ast ][ast ]`. This was likewise only a suggestion for the study group`s consideration. Apart from that, he did not consider any numbers, special functions or special characters when he drafted the memorandum.

89 The other witness for the defendants was Mr Ho Siaw Hong, a Divisional Manager in the Satellite Business Development with the first defendants. Inasmuch as his evidence was by and large complemental to the evidence proffered by the other defence witnesses, it need not detain us.

90 Mr Leong was not called by the defendants to give any evidence and in this regard the plaintiff`s counsel invited the court to draw an adverse inference pursuant to s 117 of the Evidence Act (Cap 97). I shall revert to this later in my submission.

91 Insofar as is material, the essence of the evidence of Mr Goh Tiong Hwee, an information technology consultant engaged by the Institute of Systems Science (ISS), National University of Singapore, an expert called by the defendants was that he had studied the computer programs of the plaintiff as well as that of the defendants and in his opinion, the two programs were vastly different and not substantially similar to each other. His conclusions as appear at paras 25 to 28 of his first affidavit of evidence-in-chief read as follows:

> *Comparison of the plaintiff`s computer program and the first defendants` computer program*
>
> 25 Both the plaintiff`s computer program and the first defendants` computer program enable various combination of codes pressed on the telephone to be converted into pre-arranged letters of the alphabet. However, in my opinion, there are significant differences between these 2 programs. Firstly, the routes taken by both programs in converting the various codes into the respective letters of the alphabet are entirely different. The first defendants` program adopts a pre-arranged table and requires the computation of an address into this table. All letters of the alphabet and other characters required are obtained only from this table. The plaintiff`s program, on the other hand has no such table. Instead, it `asks` a series of questions and ascertains the required letter of the alphabet at the end of these different questions. Structurally, therefore,

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> they are quite different from each other. Both routes are perfectly reasonable in achieving their objective.
>
> 26 Secondly, the structure of both programs are also quite different in view of the different languages used. The plaintiff`s program uses Basic language. The first defendants` program, on the other hand, uses Assembler language. Both languages are different `dialects` of computer languages. In other words, a person familiar with Basic language may not know Assembler language and vice-versa. Moreover, although both languages are different `dialects` of computer languages, my opinion having compared both programs is that neither program is a direct line for line or even file for file translation of the other.
>
> 27 At the same time, both Basic and Assembler are different generation of computer languages. Assembler is a 2nd generation language while Basic is a 3rd generation language. Assembler language contains virtually no English and is more like object code. The English seen on p 7 of the first defendants` computer program between line numbers 3208 and 3225, for example, are comments to assist the programmer. They are not an integral part of the program. In other words, they can be removed without affecting the running of the program.
>
> 28 Having examined the two computer programs, for the reasons stated above, it is my opinion that the 2 programs are very different and not substantially similar to each other. The only similarity is in the fact that both programs can convert various codes depressed on a telephone into letters of the alphabet. To me, this is only an idea. In any case, the routes taken to achieve this end are themselves very different.

92 In his supplemental affidavit of evidence-in-chief, Mr Goh outlined how he applied the abstraction-filtration-comparison test (applied in **John Richardson Computers Ltd v Flanders** [1993] FSR 497) to determine if the defendants` program is a copy of the plaintiff`s program. The test referred to by Mr Goh appears to entail the following three stages:

93 (1) the abstraction stage where the plaintiff`s program was dissected into different levels of increasing generality;

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94 (2) the filtration stage where the material deemed not capable of being protected by copyright was removed; and

95 (3) the comparison stage where what remained was compared to the defendants` program to determine whether there had been any copying.

96 Mr Goh said that the abstraction stage of the test could be generally described as `reverse engineering on a theoretical plane`. The idea was to break the program into different levels of increasing generality, from the most detailed level to a level where the program itself was nothing more than an idea.

97 Mr Goh then managed to break down the plaintiff`s program into the following levels of abstraction:

98 (a) Main purpose;

99 (b) Flowchart of program structure and architecture;

100 (c) Module specification and data structures;

101 (d) Algorithm;

102 (e) Source code; and

103 (f) Object code.

104 Mr Goh explained in detail functions of the foregoing levels at paras 18 to 41 of his second affidavit. Suffice it if I referred only to certain highlights of his opinion which are as follows:

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105 (a) Main purpose:

106 Specifically, the plaintiff`s BASIC program was designed to receive numeric input from the DTMF decoder and based on the input, to generate an alpha numeric input.

107 (b) Flowchart:

108 (1) The plaintiff`s program basically employs a straight line coding structure. Straight line coding is the most obvious way of writing a computer program. Basically, the programme writes down from beginning to end, the individual steps needed to accomplish the task. It would be similar to the directional instructions one would give another person as to how to get from one location to another.

109 (ii) The flow chart prepared by Mr Goh of the plaintiff`s program is as follows:

110 [See annexure C]

111 (iii) It could be seen from the flowchart drawn by Mr Goh, the flowchart or structure of the plaintiff`s programme is vastly different in both context and content from what was indeed shown to the TAS officers by the plaintiff on 27 February 1988.

112 (c) Module specification and data structure:

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113 (1) In Mr Goh`s evaluation, the plaintiff`s program had no significant data structures to speak of. The plaintiff`s program appeared to contain only simple variables.

114 (d) Algorithm:

115 He gave an illustration of an algorithm for the SETUP module which is in a way a sort of terse English the steps to be taken by a program. He added that the algorithm of a program is almost as detailed as the source code itself.

116 (e) Source code

117 The fifth step in creating a program is the coding of the source code. He explained that using the algorithm as a guide, the programmer would translate what has been written in plain English, into source code using key words a computer understands. The resultant source code is more detailed than the algorithm and will include the data structure mentioned earlier. He then made reference to the plaintiff`s program which was made available to him after the action had commenced.

118 (f) Object code:

119 The object code is the final set of instructions which the computer understands and uses directly (ie, without further translation) to run a program. However, as the plaintiff`s program is written in the `BASIC` language, it did not have an object code. According to him, the plaintiff`s BASIC program ran as source code using a BASIC interpreter without creating a separate file containing the object code.

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120 ***Filtration stage***

121

122 Mr Goh then proceeded to filter out those elements of the program which were not protected by copyright. He was in this regard advised by counsel that the following concepts were used to determine what was not protected:

123 (a) The idea-expression dichotomy;

124 (b) Facts;

125 (c) Public domain;

126 (d) The merger doctrine; and

127 (e) Elements dictated by external factors.

128 As Mr Goh had been given to understand that the only part of the plaintiff`s program alleged to have been copied by the defendants was the part which contained the Teletyper table, he confined himself only to that aspect in his application of the filtration and the subsequent comparison stage to those parts of the plaintiff`s program which converted the numeric input into an alphanumeric output.

129 In Mr Goh`s opinion, the plaintiff`s teletyper table did not actually appear in any of the module specifications. In his view, all that was left after the filtering process was the actual program code itself and this was the part which was to be used for the `comparison` stage.

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130 ***Comparison***

131

132 Mr Goh`s conclusions as appear in paras 57 and 58 of his second affidavit read as follows:

> 57 Comparing the source codes of the two programs clearly shows that there is no similarity between them. The source codes, as they were written in different languages, are clearly different. This is especially so in light of the fact that the plaintiff`s program does not actually have a table and relies on an entirely different technique to perform the encoding.
>
> 58 It is therefore my conclusion, after applying the abstraction-filtration-comparison test, that the defendants` program is not substantially similar to the plaintiff`s program.

133 ***Issues and conclusions***

134

135 The principal question in this case is whether the defendants had infringed the plaintiff`s copyright rights if any, in his table, drawing and his computer program.

136 It was submitted by plaintiff`s counsel that insofar as the table and drawings were concerned, the table was a literary work within the meaning of s 7 of the Copyright Act (Cap 63) (`the Act`) which provides that `"literary work" includes (a) a table, or compilation, expressed in words, figures or symbols (whether or not in a visible form); and (b) a computer program or compilation of computer programs;` - and the drawings are artistic works within the ambit of the same section which provides inter alia, that `"artistic work" means (a) a

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painting, sculpture, drawing, engraving or photograph, whether the work is of artistic quality or not;` Counsel contended that copyright subsisted in each of the works pursuant to s 27 of the Act.

137 He argued that the defendants` API coding table (3BA-660) was not independently created; it was substantially similar to the plaintiff`s table (1BA-55) and such a similarity viewed in the context of the opportunity the defendants had for copying the plaintiff`s table prior to creating the defendants` API coding table established a prima facie case of copying. Consequently, the burden of proof, according to him, had been shifted from the plaintiffs to the defendants and it was therefore for the defendants to prove that there was no copying. Insofar as the plaintiff`s drawings were concerned, counsel submitted that the fact there appeared to have been some differences between the two tables was irrelevant since they were substantially the same and displayed the same important characteristics. He added that the fact that the defendants` API coding table might not be regarded as a drawing in the sense the plaintiff`s works were, did not itself prevent it from infringing the plaintiff`s drawings.

138 The defendants` reply in relation to the foregoing submissions by plaintiff`s counsel was that (a) copyright law did not protect an idea but only protects the `form of expression` of the idea; (b) the plaintiff`s table was either a literary work or an artistic work but could not be both at the same time. In any event, the plaintiff`s table was not a literary or artistic work; and (c) even if the plaintiff`s table enjoyed copyright, the defendants had not infringed his copyright. In this context, counsel for the defendants submitted that (a) the defendants` API coding table was independently created; (b) it was not substantially similar to the plaintiff`s table and (c) any copying, if any, was only in respect of the idea. On matters relating to the alleged infringement by the

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defendants, of the plaintiff`s drawing, counsel for the defendants contended that the API coding table was not a drawing and was therefore completely different from the plaintiff`s drawing; and that the drawings (2BA-503, 511 and 514) alleged at trial by plaintiff`s counsel to allegedly infringe the plaintiff`s drawings were different from the plaintiff`s drawings (1BA-55).

139 It is an aphorism that the law of copyright does not protect the `idea` but it protects the `form of expression`. For a copyright to be infringed, the defendant must be shown to have copied that form of expression (see George Wei, **The Law of Copyright in Singapore** [1989] at p 14). The learned author, however, sounds a note of caution by adding a footnote to the foregoing (see footnote 33 at p 14 supra) that the concept that copyright is only concerned with the form of expression is perhaps at its weakest in connection with the question of infringement and that extremely difficult problems arise in differentiating the central idea of a work from its form of expression.

140 In LB (Plastics) Ltd v Swish Products Ltd [1979] RPC 551, Lord Wilberforce said at p 619 that:

> *... The protection given by the law of copyright is against copying, the basis of the protection being that one man must not be permitted to appropriate the result of another`s labour. That copying has taken place is for the plaintiff to establish and prove [it] as a matter of fact. The beginning of the necessary proof normally lies in the establishment of similarity combined with proof of access to the plaintiffs` productions.*

141 However, where there is substantial similarity, that similarity is prima facie evidence of copying which the party charged may refute by evidence that notwithstanding the similarity, there was no copying but independent creation` (see the observations by Lord Wright in **King Features Syndicate, Inc & Anor**

v O and M Kleeman, Ltd [1941] AC 417 at 436 which were re-affirmed by Lord Hailsham of St Marylebone in ***LB Plastics*** (supra) at p 625 line 1).

142 Lord Salmon made a general observation in ***LB Plastics*** (supra, at p 615) that `you need a concept in order to put it down on paper. There is no copyright in a concept but once it is put down on paper, there is a copyright in what is on the paper.`

143 The first contention on behalf of the defendants was that the plaintiffs could only claim copyright protection for his table, if at all, either as literary work or as an artistic work, but he could not put forward a double-barrelled claim that it was a literary and/or artistic work as pleaded in para 9 of his statement of claim. However, the plaintiff`s counsel`s submission in this regard (para 10(1) of his written submission) was that the plaintiff`s table was literary work and his drawings were artistic works within the meaning of s 7 of the Act.

144 Counsel for the plaintiff submitted that the plaintiff`s table had, as its important characteristic, the use of base keys `[ast]`, `0` and `[num]` as pre-control keys with the numerical keys representing the letters of the alphabet in order, and the use of the key `00` for the number `0` and a single key for numbers 1 to 9. He then contended, quoting the plaintiff`s expert Mr See, that the plaintiff`s coding system was a substantially new and efficient work of originality with minimum key strokes to convert alpha-numeric cum auto error correction, erase and space functions. He also emphasized that the plaintiff`s use of the double digit `00` represented the foundation-stone of the alpha-numeric coding systems. He argued that although the plaintiff`s table might be viewed as a compilation of known elements, it was nonetheless an original work involving ingenuity, skill and labour in the arrangement of those elements

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resulting in an important and novel work. He submitted that originality in copyright works merely required the author to have made the work with his own skill and labour and not to have copied from another. Reference was made in this regard to an observation by Lord Reid in **Ladbroke (Football) Ltd v William Hill (Football) Ltd** [1964] 1 WLR 273 at 277 which reads:

> *To my mind, it does not follow that, because the fragments taken separately would not be copyright, therefore the whole cannot be. Indeed, it has often been recognised that if sufficient skill and judgment have been exercised in devising the arrangements of the whole work, that can be an important or even decisive element in deciding whether the work as a whole is protected by copyright.*

145 The facts of the ***Ladbroke*** case as set out in the speech of Lord Reid are as follows.

146 William Hill (Football) Ltd, the respondents, are well-known bookmakers. Each week during the football season they have for many years sent out to their clients - referred to as punters - a fixed odds football betting coupon. Ladbroke (Football) Ltd, the appellants are also old-established bookmakers. They decided to enter this field of betting in 1959 and began to send out coupons which closely resembled the respondents` coupons.

147 The coupon under reference was a sheet of paper on which were printed various lists of forthcoming matches between well-known teams. One called `Nothing Barred` was a full list of some 50 matches. The others are shorter lists of matches selected by the bookmaker from the full list. It was not disputed that a vast amount of skill, judgment, experience and work had gone into building up the respondents` coupon.

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148 When the appellants decided to enter this field they had to devise a suitable form of coupon. Their manager who was given this task was formerly employed by the respondents, but it appeared that he tried to devise a form of coupon substantially different from the respondents` coupon. The coupons of some 20 other firms in the business were produced at the trial, and, while they have a general similarity, they vary very much in the nature of their lists and the variety of bets offered in respect of many of the lists. Most of them were studied by the appellants` manager, but his proposals were rejected by the appellants` managing director who adopted in the end a form closely similar to the respondents` coupon.

149 The respondents claimed copyright in their coupons and alleged infringement by the appellants. The appellants maintained that only certain parts of the respondents` coupons were copyright and denied any infringement. In the first instance, the decision of Lloyd-Jacob J went in favour of the appellants. But it was reversed by the Court of Appeal - per Lord Denning MR and Donovan LJ (Diplock LJ dissenting) and consequently an injunction was granted against the appellants. The appellants appealed to the House of Lords to have the order of Lloyd-Jacob J. restored.

150 In affirming the decision of the Court of Appeal, the House of Lords held that there had been a breach of copyright by the appellants since the respondents` compilation which must be regarded as a single work, was `original` and protected by copyright and the part taken by the appellants was substantial. The House also held (see p 274, supra) that `it did not follow that because the fragments of the compilation, taken separately, would not be copyright, the whole could not be copyright.`

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151 Lord Evershed in his speech (at p 281) observed:

> *... When you take one of these coupons in your hand and look at it, the right conclusion is, to my mind, that it falls sensibly and properly within the definition of an original literary compilation. True it is that no question of literary taste or quality is involved that would give to the coupon the award of literature as normally understood. But, having regard to the introduction of a compilation into the definition, that clearly cannot be a decisive factor, since otherwise such things as lists or catalogues could never have been held to have been properly subject to copyright. The result, in my opinion, is that the respondents` coupon is in truth a compilation in writing which is distinctive and original. True it is that a great amount of work is devoted to calculating the odds; but this is not a case in which, in my opinion, the resulting document, that is the coupon, has involved no further skill, labour or judgment - any more than was the list of matches themselves treated as involving no distinctive or original work by Upjohn J (as he then was) in the case of the* ***Football League Ltd v Littlewoods Pools Ltd****. There can, in my judgment, be no doubt upon the evidence in the present case that, when all the hard work has been done in deciding upon the wagers to be offered, there still remains the further distinct task, requiring considerable skill, labour and judgment (though a different kind) in the way in which the chosen wagers are expressed and presented to the eye of the customer. ...*

152 Lord Pearce in his speech (at p 291 supra) after expressing similar views added that in cases of this nature, `the courts have looked to see whether the compilation of the unoriginal material called for work or skill or expense by copying it without taking the trouble to compile it themselves. So the protection by such copyright is in no sense a monopoly, for it is open to a rival to produce the same result if he choses to evolve it by his own labours.

153 The defendants` counsel placed reliance on a House of Lords decision in **GA Cramp & Sons, Ltd v Frank Smythson, Ltd** [1944] AC 329 and argued that the plaintiff`s table could not be regarded as a literary work. Implied in this argument was the suggestion that the plaintiff`s table did not involve any ingenuity; it was commonplace and the arrangement of the letters in sequence

on a telephone keypad did not involve any originality. In ***Cramp & Sons*** the facts and the decision of the House of Lords as set out in the headnotes of the report are as follows.

154 The appellants Cramp & Sons Ltd and the respondents Frank Smythson Ltd were both publishers of pocket diaries. The respondents complained that the appellants, in a diary published by them, had infringed the copyright in their `Liteblue` diary. The issue published by the respondents in 1932 for 1933 contained the usual diary pages and these were accompanied by pages containing information of the kind usually found in diaries - a calendar for the year, postal information, a selection of days and dates for the year, tables of weights and measures, comparative time tables, a percentage table, and the like. In 1938 a former employee of the respondents, then employed by the appellants, copied seven of the tables in the respondents` diary and inserted them in a diary published by the appellants. The respondents brought an action against the appellants alleging infringement of their copyright.

155 In reversing the decision of the Court of Appeal and restoring the decision of the judge in the first instance, the House of Lords held that copyright was not established since the commonplace matter of the tables left no room for taste or judgment and their selection did not constitute an original literary work. Viscount Simon LC commented at p 336:

> *... There remains, I ageee, the element of choice as to what information should be given, and the respondents contend that the test of originality is satisfied by the choice of the tables inserted, but the bundle of information furnished in the respondents` diary is commonplace information which is ordinarily useful and is, at any rate to a large extent, commonly found prefixed to diaries, and, looking through the respondents` collection of tables, I have difficulty in seeing how such tables, in the combination in which they appear in the respondents` 1933 diary, can reasonably claim to be `original work.` There was no*

> *evidence that any of these tables was composed specially for the respondents` diary. There was no feature of them which could be pointed out as novel or specially meritorious or ingenious from the point of view of the judgment or skill of the compiler. It was not suggested that there was any element of originality or skill in the order in which the tables were arranged. My own conclusion is that the selection did not constitute an original literary work.*

156 The defendants` counsel argued that the plaintiff`s table was indeed commonplace in that the sequence of the keys and the arrangement of the alphabet in their normal order over the numerals was the only logical way of ordering them. As regards the choice of base keys too, the submission by the defendants was that for user friendliness the choice in this regard was limited to `1, 2, 3` or `[ast ]` `0` `[num ]`. Reference in this context was made to the plaintiff`s evidence at p 122F of the NE and Mr See`s evidence at p 390C of the NE. The alternative argument by defendants` counsel was that at any rate, the defendants` API Coding Table was produced independently from the plaintiff; it was not substantially similar to the plaintiff`s table and any copying, if at all, was only in respect of the idea.

157 Having reviewed the authorities referred to me and the evidence of the contestants, my finding was that although the plaintiff`s table entailed, no doubt, some measure of skill and effort and that the defendants had indeed an opportunity to have sight and access to the plaintiff`s table on 27 February 1988, there was, nevertheless sufficient cogency in the defendants` argument that the defendants` table which appeared to possess features similar to that of the plaintiff was independently created. In this regard, reference must be made to the defendants` internal memorandum dated 5 March 1984 (more than four years before the plaintiff`s demonstration) where Mr Lim Toon had proposed the use of `[ast ]`, `0` and `[num ]` on the DTMF pad. In that memo Mr Lim Toon had suggested that `[ast ]1` to stand for `A`, `01` for `B`, `[num ]1` for

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`C`, `[ast ]2` for `D` and so on. It was argued for the plaintiff that Mr Lim Toon had intended the second control key to be `1`(and not `01`) to represent the letter `B`, `2` (and not `02`) to represent the letter `E` and so on. But having reviewed the evidence, I arrived at the conclusion that the plaintiff`s aforesaid contention was unjustified. In this regard I had no reasons to doubt the veracity of Mr Lim Toon whose evidence was corroborated by Mr Ma.

158 Lest it is suggested that I had overlooked it, I must say at this juncture that I had indeed given careful consideration to another internal report of the defendants dated 18 April 1988 (2BA-502 to 3BA-807) where it was stated that `[a] coding method which is a modified version to what has been demonstrated by Photo Electronic Research Centre was adopted.` However, after hearing the explanation of Mr Hair as to the connotation behind the word `modified`, I concluded that the table of the defendants had an independent origin and development. After all, the plaintiff himself had conceded (paras 42 to 47 of his affidavit) that his table did not represent the only method of keying in both letters and numbers and in this connection he himself had drawn the court`s attention to the methods employed by James Martin and the rest.

159 Furthermore, the plaintiff`s table which was annexed to the statement of claim (BP-12) was not the one that was handed to Mr Leong by the plaintiff in February 1988 (see BA-55) and also that the defendants` API coding table (see 1BA-104) which was alleged to have infringed the plaintiff`s table was, in my opinion, not substantially similar to the plaintiff`s table. The striking similarity contention advanced by the plaintiff was in my opinion not well-made on account of the fact that the defendants were admittedly carrying out their own research in lines similar to that of the plaintiff and were considering the use of `[ast ]` `0` and `[num ]` as the control keys although it was plain that the

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defendants were encouraged by the demonstration done by the plaintiff on 27 February 1988 and may have possibly adopted some of the ideas of the plaintiff.

160 It is instructive at this juncture to refer to an old English decision in **Corelli v Gray** [1913] 29 TLR 570 where it was held that if someone were to independently arrive at the same result as another, whether it is in the form of a book, play, painting, song or other expression of idea, then there is no breach of copyright. In this way, copyright law is different from patent or design protection, in that no absolute monopoly is given to another analogous to that conferred on inventors of patents.

161 Dealing with the issue raised on the plaintiff`s drawings, it would appear from para 14 of the plaintiff`s statement of claim that the alleged infringement was confined to the editions of the Singapore Telephone Directories. However, during trial, the plaintiff`s counsel indicated that the defendants` drawings which infringed the plaintiff`s drawings were found at 2BA-503, 511 and 541 (p 55 of the NE). Strictly, going by the pleadings, the court was unable to accept the plaintiff`s averment that the editions of the Singapore Telephone Directories referred to the court - which contained the defendants` API coding table - copied and reproduced the plaintiff`s drawings.

162 At any rate, if one were to compare the plaintiff`s drawings at BA-55 with the defendants` drawings at 2BA-503, 511 and 541, there were indeed many substantial differences as pointed out and tabulated by defendants` counsel at pp 39 to 42 of their written submission as follows:

(a) 2BA 503

(i) The symbols above keypad `9` in the plaintiff`s drawing are `YZ[gt]` while those in the defendants` drawing are `YZ`.

(ii) The word above keypad `[ast ]` in the plaintiff`s drawing is `SPELL` while the symbols in the defendants` drawing are `EXT - CAN`.

(iii) The symbol above keypad `0` in the plaintiff`s drawing is `0` while those in the defendants` drawing are `, 0. ` (comma, 0, full stop).

(iv) The word above keypad `[num ]` in the plaintiff`s drawing is `BACK` while the symbols in the defendants` drawing are `/ $ [lt ] `.

(b) 2BA 511

(i) The letters above keypad `1` in the plaintiff`s drawing are `ABC` while those in the defendants` drawing are `&QZ`.

(ii) The letters above keypad `2` in the plaintiff`s drawing are `DEF` while those in the defendants` drawing are `ABC`.

(iii) The letters above keypad `3` in the plaintiff`s drawing are `GHI` while those in the defendants` drawing are `DEF`.

(iv) The letters above keypad `4` in the plaintiff`s drawing are `JKL` while those in the defendants` drawing are `GHI`.

(v) The letters above keypad `5` in the plaintiff`s drawing are `MNO` while those in the defendants` drawing are `JKL`.

(vi) The letters above keypad `6` in the plaintiff`s drawing are `PQR` while those in the defendants` drawing are `MNO`.

(vii) The letters above keypad `7` in the plaintiff`s drawing are `STU` while those in the defendants` drawing are `PRS`.

(viii) The letters above keypad `8` in the plaintiff`s drawing are `VWX` while those in the defendants` drawing are `TUV`.

(ix) The letters above keypad `9` in the plaintiff`s drawing are `YZ[gt]` while those in the defendants` drawing are `WXY`.

(x) The word above keypad `[ast ]` in the plaintiff`s drawing is `SPELL` while the symbols in the defendants` drawing are `ETX.SP`.

(xi) The symbol above keypad `0` in the plaintiff`s drawing is `0` while the defendants` drawing is blank.

(xii) The word above keypad `[num ]` in the plaintiff`s drawing is `BACK` while the symbols in the defendants` drawing are `$-BS`.

(c) 2BA 541

(i) The letters above keypad `1` in the plaintiff`s drawing are `ABC` while those in the defendants` drawing are `SP QZ`.

(ii) The differences with respect to keypads `2` to `9` are the same as those mentioned in sub-paragraph b) above.

(iii) The word above keypad `[ast ]` in the plaintiff`s drawing is `SPELL` while the symbols in the defendants` drawing are `ETX . &`.

(iv) The symbol above keypad `0` in the plaintiff`s drawing is `0` while the symbols in the defendants` drawing are `$ 0 -`.

(v) The word above keypad `[num ]` in the plaintiff`s drawing is `BACK` while the symbols in the defendants` drawing are ` % ? BS`.

163 It was contended on behalf of the plaintiff that the fact that the defendants` drawings may be perceived to have differences to the plaintiff`s drawings was of no relevance as they were substantially the same and display the same important characteristics.

164 In **McCrum v Eisner** [1917] 117 LT 536; 87 LJ Ch 99, the plaintiff was the owner of the copyright in a series of picture postcards, one of which represented a soldier reading the orders of the day, with the legend underneath: `And then we have all the rest of the day ourselves.` The defendant published a picture postcard also representing a soldier reading the orders of the day and with a similar legend underneath, but the expression and get-up of the two cards were entirely different. Peterson J, in dismissing the claim of the plaintiff held that there was no copyright in the idea of a recruit coupled with `the orders of the day.`

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165 In my finding, the expression as well as the general get-up of the defendant`s drawings were quite dissimilar to the get-up and features of the other. In the premises, I am unable to agree with the plaintiff`s submission that the artistic copyright of the plaintiff, if any in his drawings was copied or colourably or substantially imitated by the defendants. Furthermore, in my opinion, the plaintiff cannot successfully claim to have monopoly of the numerals 1 to 9 according to their logical or numerical sequence and the placement of the letters of the English alphabet in groups of three also according to their usual sequence. The placement of the symbols `[ast ]` `0` and `[num ]` at the end or bottom of the keypad was equally a logical step having regard to the keypads known to one and all that it would be unusual to place any keys to precede the numeral `1` on keypads.

166 The next issue concerns the computer program. In this respect it was not in dispute that the plaintiff did not at any stage allow access to his program to any of the defendants` representatives; nor did he disclose the source or object code of his program. The argument presented on his behalf was that the defendants` computer program was an adaptation or version of the plaintiff`s program achieved through the use of the plaintiff`s table, drawing and information derived from the demonstration on 27 February 1988. It was further contended on his behalf that a sufficiently precise verbal description or specification of a copyright work could perform the same function as, for instance, a physical copy of an artistic work, by providing a means by which a person can, by following the verbal description or specification, reproduce or appropriate the substantial features of the original work and thus infringe copyright in the work. Counsel for the plaintiff relied on the decisions in **Autodesk Inc & Anor v Dyason & Ors** [1992] 22 IPR 163 and **Autodesk Inc & Anor v Dyason & Ors (No 2)** [1993] 25 IPR 33[1993] 176 CLR 300.

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167 Counsel for the plaintiff contended (para 47 of his submission) that `on the basis of the ***Autodesk*** decisions, the plaintiff should be able to establish infringement of copyright in any computer program which he had produced, if the effective result of any computer program operated by the first defendant was to achieve the same result as that desired by the plaintiff by the use of the computer program to interpret the code and to convert the code into an alphabetical message which can be understood.`

168 The ***Autodesk*** decision is an important development in the law of intellectual property particularly on copyright protection and a subject of much debate by academics and textbook writers. The facts, issues, arguments and the decision in ***Autodesk*** are extremely well treated by McKeough and Stewart in their book ***Intellectual Property in Australia*** (2nd Ed, 1997) and I intend to adopt portions of them in this grounds.

169 The applicants (first appellants), Autodesk Inc, is a Californian company which owns the copyright in a computer program known as `AutoCAD`. The AutoCAD program enables a user to produce drawings which assist in the drafting of architectural and engineering plans and designs. The letters `CAD` in AutoCAD stand for `computer assisted drafting`. The second appellant, Autodesk Australia Pty. Ltd, is a Victorian company which is a wholly-owned subsidiary of the first appellant. Autodesk Australia Pty Ltd is the exclusive licensee of Autodesk Inc throughout Australia with respect to its copyright in AutoCAD.

170 AutoCAD is sold by dealers. The purchasers receive a package including a number of disks which contain software in the form of the drafting program. It is easy to make copies of these disks and it would appear that many users do

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so, if only for replacement purposes should the original disks be damaged. Copying for that purpose is permitted under s 43A of the Copyright Act 1968 (Cth) (`the Act`). Because the disks are easily copied, there is a danger that persons who have not purchased the disks from an AutoCAD dealer may pirate them by making unauthorised copies. To avoid piracy of this kind, the appellants developed a hardware device called an `AutoCAD lock`, without which the AutoCAD program cannot be run. The lock is plugged into the computer, and peripheral devices such as printers or monitors are in turn plugged into the lock. Without the lock in place the computer will not run the AutoCAD program, although other programs may be run with the lock in place. A single lock is supplied with each purchase of the AutoCAD package and cannot be purchased separately. The cost of an AutoCAD package is approximately $5,200 which includes the price of the AutoCAD lock. Thus, even though a purchaser of AutoCAD might make copies of the disks containing the program, with only one lock he can run only one set of disks at a time. That is the purpose of the AutoCAD lock: to ensure that the purchase of a single AutoCAD package does not result in multiple use of the program.

171 The third respondent, after making a close examination of the operation of the AutoCAD lock, designed an alternative device, called an Auto Key lock, which performs the same function as the AutoCAD lock. It will be necessary to refer to the precise method employed by the third respondent, but for the moment it is sufficient to note that, with the aid of the first and second respondents, the Auto Key lock was placed upon the market at a price of about $500.

172 In discussing the definition of `computer program`, Northrop J, at first instance (1989) 15 IPR 1, said that there was little doubt that each lock was `a

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device having digital information processing capabilities` and also devised `to perform a particular function`. On this point the learned judge noted that the performance of a function is a new concept in copyright in a literary work and removes the necessity to consider whether a literary work could be understood by a human being, or whether it needs to convey pleasure or information: in other words, being intended to perform a function is the mark of a computer program. Furthermore, the encoding of digital information on the shift register (as used by the AutoCAD lock) or the EPROM (used in the Auto-Key lock), which allowed the locks to function, constituted an expression in a `language, code or notation`. On the question of whether the Auto-Key lock was a reproduction of the AutoCAD lock and therefore an infringement of the copyright of Autodesk in the lock (being a computer program), Northrop J referred to the views of Gibbs CJ in **Apple Computer Inc v Computer Edge Pty Ltd** [1983] 50 ALR 581 that reproduction of a substantial part of the work involves two elements - `that the infringing work sufficiently resembles the copyright work and that it was produced by the use of the copyright work.`

173 The result in the trial of Autodesk was overturned on appeal to the Full Federal Court (see (1990) 18 IPR 109). All three judges disagreed with the proposition that the lock itself either contained or constituted a program. The Full Court went on to hold that AutoCAD had not been reproduced, nor adapted, but that the alternative Auto-Key was a development of an original idea to produce a cheaper computer product entirely different from AutoCAD despite the fact that it produced the same result. In so finding the judges adhered to the traditional `form` requirement of copyright protection which does not allow protection of an underlying idea.

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174 On appeal, the High Court of Australia held (per Dawson J, with whom the rest of the court agreed: (1992) IPR 63) that, in creating a device to interact with Widget C which allowed the AutoCAD program to run, this resulted in copyright infringement as a substantial part of a literary work (Widget C`s message from the `look-up table`) had been reproduced. Despite the fact that the look-up table was not a computer program itself, because it was not a set of instructions, it was still a `substantial, indeed essential part` of the computer program comprised in Widget C. In August 1992 an application was made to the High Court to re-open the ***Autodesk*** case. The respondents sought to have the matter re-argued on the grounds that:

175 (i) the look-up table in Widget C did not amount to a set of instructions but was simply data; and

176 (ii) the look-up table was not a substantial part of the Widget C program.

177 The application was dismissed by the majority per Brennan, Dawson and Gaudron JJ (Mason CJ and Deane J dissenting - see (1993) 25 IPR 33 who considered (inter alia) that the respondents had been given ample opportunity to be heard. In his dissenting judgment, Mason CJ rejected the idea that the functional aspect of a program determines its substantiality and said that in copyright law the emphasis is on originality of the part allegedly taken. However, the emphasis on the function of a computer program as determining what is a `substantial part` was maintained by the majority.

178 Having regard to the views expressed by the High Court of Australia in ***Autodesk No 1*** , counsel for the plaintiff submitted (para 62 of his submission) that infringement would be determined by whether or not a substantial part of

that work - considered as a single work - had been taken. He suggested that the answer in regard to the case at hand must be in the affirmative and urged the court to find that there was a clear case of copyright infringement by the first defendants and inasmuch as the defendants had not endeavoured to distinguish the other defendants` respective liabilities, a finding of infringement against the first defendants must necessarily result in a finding against the other defendants.

179 The defendants` counsel contended that the Autodesk decision ought not to be followed in Singapore. However, even if it is adopted, he argued that the case at hand could be easily distinguished from Autodesk. Counsel said that the main difference is that the `look-up table` in the Autodesk case comprised some 2127 random binary numbers (ie, numbers which are either `1` or `0`) arranged in random order. Consequently, the number of possible arrangements of the look-up table would have been 2127 - which gives the 39 digit figure of 170, 000, 000, 000, 000, 000, 000, 000,000, 000, 000, 000, 000. The statistical improbability of the defendants in the Autodesk case coming up on their own with same sequence of binary numbers led to the inevitable conclusion that the defendants must have copied the plaintiff`s program. Reference in this regard must be made to an observation by Dawson J that `it would be virtually impossible to calculate it or duplicate it by accident: in a sequence of 127 binary digits, the possible alternatives would be 2127 (see 22 IPR 163 at p 169, line 8). Counsel added that by contrast there are at best a small handful of meaningful ways in which to provide a coding method for the alphabet using only three base keys of a telephone keypad. He submitted that it required no great effort (even without any access to the plaintiff`s table, such as it was) for the TAS to have devised their ultimate API coding table.

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180 The learned authors McKeough and Stewart (supra) highlight the feature that in ***Autodesk*** the High Court of Australia had gone on to confer protection on the function of the program, thereby showing a tendency to protect the idea rather than the expression of the idea - despite a `ritual incantation` of basic copyright principles. The Copyright Law Revision Committee of Australia (CLRC) had also thought fit to comment (see Computer Software Protection, para 5.25) that:

> *The conclusion that the look-up table was a substantial part of the Widget C program, with the result that copying of the look-up table constituted copying of the program, causes the Committee some concern. Further, the conclusion that the creation of the look-up table in Autokey from observation of the operation of Widget C and the AutoCAD lock was a copying of the look-up table in Widget C, even though the maker of Autokey (Mr Kelly) never saw the table, is also viewed by the Committee as far-reaching and questionable extension of copyright.*

181 Having reviewed the evidence and considered all the arguments, I agree with the submissions made on behalf of the defendants that the facts of the case at hand are vastly different and can be distinguished from that of the ***Autodesk*** case. In ***Autodesk*** , there was a creation of a device by one of the respondents to interact with Widget C which allowed the AutoCAD to run and this feature weighed in the mind of the High Court when it held that such an act constituted infringement - regardless of the fact the maker of the Autokey (the respondents) never had sight of the look-up table. In fact, the defendant in that case performed reverse analysis on the computer lock (dongle) by checking the signals between the lock and the computer program using an oscilloscope without dismantling the lock. In the case at hand, however, the diagram shown to the TAS representatives by the plaintiff on 27 February 1988 was merely a non-detailed outline of how the plaintiff proposed to send the alpha-numeric messages through a DTMF telephone and nothing more. There was no evidence of any

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nature to suggest that the defendants at any point of time even faintly concerned themselves with the plaintiff`s computer program and there was, therefore, no question of any reproduction or colourable imitation or adaptation of any literary work of the plaintiff`s computer program.

182 In my opinion, the defendants could not be said to have infringed the literary work comprised in the plaintiff`s program in any matter or form and in this regard I preferred to accept the views and analyses by the defendants` expert, Mr Goh. In the circumstances, it was entirely unnecessary for me to express any opinion whether I should adopt the Abstraction-Filtration-Comparison method propounded in the case of **Computer Associates International, Inc v Altai, Inc** [1992] 982 F 2d 693 as well as in **John Richardson Computers Ltd v Flanders (No 2)** [1993] 21 FSR 144; 26 IPR 367.

183 Before concluding, I must touch upon a submission by plaintiff`s counsel that the court should draw an adverse inference against the defendants for their failure in not calling Mr Leong as a witness. In this regard, documentary evidence submitted to the court established that in fact by a consent order made on 13 March 1995 the plaintiff was indeed granted leave to call amongst other persons, Mr Leong, to give evidence at the trial of this action. The court was also in this connection referred to a statement of evidence by Mr Leong (3AB-673 to 685) duly furnished to the plaintiff`s solicitors. In the circumstances, the plaintiff`s contention that the court should draw an adverse inference against the defendants on account of their not calling Mr Leong was unmeritorious.

184 In fine, having reviewed all the evidence and arguments presented, I was of the opinion that the defendants had not infringed the plaintiff`s copyright in

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his table, drawing and/or the computer program although as mentioned by me earlier, the defendants might well have been encouraged by the demonstration and expedited their project in relation to the transmission of alpha-numeric messages to pagers through their DTMF phones. Consequently, the plaintiff`s action against all the defendants was dismissed with costs.

185 **Outcome:**

186 Plaintiff`s claim dismissed.

MPH Rubin J

Lim Chuen Ren and Leong Chee Wei (Cheong Hoh & Associates) for the plaintiff
Michael Hwang SC, Leonard Goh and Tan Hwee Meng (Allen & Gledhill) for the defendants