



ASSOCIATION FOR COMPUTING MACHINERY

Hong Kong Chapter

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2 Chairman's message

This is the first quarterly newsletter of ACM-HK in 1997. ACM-HK is under the leadership of a new Executive Committee, which was elected in November 1996. First of all, on behalf of the new exco, I would like to take this opportunity to wish all ACM HK members a very successful 1997.

This is my third year of service in ACM-HK, first as an exco member, then as Vice Chairman and now as Chairman of ACM-HK. Over the past years, I have witnessed a strong growth of ACM-HK under the leadership of the past Chairman, Dr. K.F. Wong, and the dedication of the exco members. I am glad that I am given the opportunity to serve ACM-HK in a new capacity. It is a daunting task for me to sustain and, if at all possible, exceed the achievements of ACM-HK in the past years. I will need the help of the executive committee as well as each individual ACM-HK member in meeting the challenges and harvesting the opportunities ahead of us.

The past year has been an extremely successful year for ACM-HK. We started a short course programme which, in addition to serving ACM-HK members, brought in some much needed profits for ACM-HK. We resumed the Computer Chinese Checker contest to complement the Scholastic Programming Contest (see section 9). We collaborated in many technical conferences which gave discount registration to ACM-HK members. And the list will go on and on if I detail every single event here. It is our plan to continue these activities in the coming year (see section 6 for our yearly plan). Numerically, ACM-HK has almost doubled

the membership in the past year to close to 500 members and increased the general budget multifold (or should I say infinitefold because we had nearly zero general budget to run ACM-HK in the past).

In my opinion, a very important strategic decision made by ACM-HK last year was to open our membership to non-ACM members. In the past, all and only ACM members are ACM-HK members. In the December 6, 1996, executive committee meeting, ACM-HK agreed to introduce a new category of membership, conveniently called local members, for those who were not members of ACM but wanted to join ACM-HK for some reason (see section 7). The target audience, as I envision, will be highschool students, highschool teachers, practitioners who want to be connected to ACM-HK for any reasons (e.g., our perceived academic orientation). The local membership will extend our services to a broader audience. It may dilute our highly homogeneous membership (ACM members have a minimum educational qualification to meet whereas local members don't), but it will increase our visibility and influence in Hong Kong's computing community. In my opinion, it is well worth the effort. If you have any friends or colleagues who want to join ACM-HK, please pass to them the registration form at the end of this newsletter; just indicate clearly that it is for local membership and include a check of HK\$100 payable to ACM Hong Kong Chapter.

If you have anything which you would like to share with us (e.g. comments about ACM-HK, comments about the newsletter, activity suggestions), please do not hesitate to drop us a line.

Dik Lee
Chairman of ACM-HK and
Reader, Computer Science, HKUST

3 From the Editor

Starting from this issue, at the end of each newsletter there will be a feature article. The article will be written by experts who will try to give a brief yet precise description of a technical topic to our readers. In this issue, the article "WHAT IS MODEM?" explains the mechanisms and clarifies some of the myths behind the tool which we commonly (yet ignorantly) used.

If you are interested to share some of your ideas with us, please send your manuscript to Dr. Kam-Fai Wong, Dept. of Systems Engineering and Engineering Management, Chinese University, Shatin, HK (kfwong@se.cuhk.edu.hk). We shall try our best to accommodate you.

4 1996/97 ACM-HK EXCO

The new Executive Committee has been formed in November 1996. The officers are:

Dik L. Lee	Chairman	CS, HKUST	dlee@cs.ust.hk
Ho-Fung Leung	Vice Chairman	CS, CUHK	lhf@cs.cuhk.hk
Antonio Si	SPC97 Director	Comp., PolyU	csasi@comp.polyu.edu.hk
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You are welcome to contact anyone of them either via their personal email or via the acm-hk email address at acm-hk@cs.cuhk.edu.hk.

5 1996/97 ACM-HK Annual Meeting

The first ACM-HK annual meeting was held in Hongkong Hotel. This meeting was very important to the Association. It has helped boost our profile in the local computing community, academic and industry alike.

Many heads and/or representatives from the seven local tertiary educational institutions and computing societies attended the meeting. They were very impressed by the achievement we made in last year and many had expressed interests in collaboration, e.g. in joint organisation of technical seminars.

The highlight of the evening was an insightful seminar delivered by Mr. Laurie Kan, the managing director of Microsoft HK. In his interesting talk, Mr. Kan shared with the audience his view of the software industry in Hong Kong at present and in the future. Under his prediction, the success of the HK software industry will continue beyond 1997 especially in the area of Chinese (multi-dialect) Internet related applications.

After the seminar, the guests were joined by the ACM-HK members in a delicious Chinese banquet.

The Annual Meeting was a true success. It created a good opportunity for us, for our local members as well as for our VIP guests to know more about each other.

6 1996/97 Year Plan

In the first EXCO meeting, the following activities was planned for the coming year:

1. 1996/7 Annual Meeting, Hongkong Hotel, Dec 11, 1996.
2. Chinese Checkers Competition, PolyU, July 5, 1997.
3. 7th Scholastic Programming Contest, July 5, 1997.
4. Technical short course in summer.
5. Support or co-operate with others in conference/seminar organisations.
6. Web page competition (tentative).

7 Membership in Hong Kong

We have recently received the latest membership list from ACM Headquarter and we are proud to present that our ACM-HK membership has risen from 290 to 493 (i.e. a ca. 70% increase). These members are, in fact, ACM members who are presently residing in Hong Kong.

In addition to the above full membership, last year we have prepared the local membership scheme. It is now ready to be announced. The local membership rate is HK\$100 per year. Local members will receive the quarterly newsletter and are eligible to participate in all the local activities. For someone who has little association with the USA, the local membership is an excellent deal. I hope you can help encourage more people to join us. Should you require some application forms, simply send us an email at acm-hk@cs.cuhk.edu.hk.

8 Membership Registration

ACM-HK has always been an environmental friendly computing society. We always try our best to send out information to our members electronically. To achieve that, we require your cooperation — please kindly take some time and fill out the form at the end of this newsletter. Once you have filled out and sent the form back to us, you will entitle to the following service:

- Regular information, including the quarterly newsletter.
- Your name and contact information appear on the ACM-HK home page.

9 Scholastic Programming Contest (SPC)

SPC is an annual ACM-HK event. It gives an excellent opportunity for educators as well as students in computer related subjects to meet and to share some fun. This is certainly an important local academic activity and can help foster computer science in Hong Kong.

This year's event will be organised by the Department of Computing of the Hong Kong Polytechnic University on July 5, 1997. Following the growing demand from the past participants, SPC'97 will be the largest ever. We shall allow 2 teams from each institute to compete in the contest. This will, no doubt, increase the competitiveness and the excitement of the event. Both PolyU and ACM-HK are looking forward to jointly hosting it.

In order to ensure the success of this event, we would like to seek your supports in the following ways:

If you are **an academic**, encourage your students to participate in this event (e.g. to hold an in-house selection competition and to ask more students to participate in it).

If you are **a computing professional**, we would appreciate any form of sponsorship from you (e.g. cash, small gifts, studentship, book tokens, ... etc.) for the winning teams. Please contact Dr. Antonio Si, PolyU, tel: 2766 7279, fax: 2774 0842 or email csasi@comp.polyu.edu.hk for this matter.

Running alongside SPC'97, there will be a Chinese Checker Competition. The Call For Participation of the above events is under preparation. They will be sent to the 7 tertiary institutes as soon as they are finished. Also, similar information will be posted on the web.

10 Feature Article

WHAT IS MODEM ?

S.W. Ng.,
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Modem is an acronym of Modulator-Demodulator. The basic principle of modem is to convert a binary digit "0" or "1" into a series of sinewaves. Our tone dialing phones use the same principle. There is a different tone (or frequency) for each digit 0-9. This sinewave is called the "carrier signal". But why do we bother to convert it into a sinewave ? It is because when a sinewave travels down the telephone line, it suffers the least distortion and the distortion is much predictable than others. Indeed, the carrier frequencies (or tones) of the high speed modems today are the same as the slow ones many years ago. The difference is we are using microprocessors with sophisticated encoding and signal recovering algorithms inside the modems. More than one binary digit is encoded onto every sinewave the modem sends out. Therefore, modems nowadays should be called Encoder-Decoder.

The telephone system in Hong Kong is the most modern one around the world. We have optical fibers almost everywhere from buildings to buildings. Our phone calls are converted into digital signal and travel down the optical fibers. The only non-digital system is the wire between your phone and the switch-box in your building. Therefore, the distortion is almost minimum. If you are using a high speed modem , like 28.8K, you should appreciate what HK Telecom has done for us. I still remember a decade ago, a branch of Tai Fung Bank in Macau failed to go on-line simply because the telephone company could not provide a well-condition phone line for the branch. Many years ago, the banks are the main users of modems. They hired private (or lease) lines from the telephone company. At that time, the telephone company people had to screen out a well-condition line from many of their lines manually. Many of us will remember noise and cross-talk were common on our phones. While human being is a highly fault tolerance system, our computers are not. Thanks for the introduction of optical fibers, our telephone lines are much clearer now.

Modems today are operating in Full-duplex mode using the same transmission rate on both directions. Full-duplex means both parties can talk together. In the past, modems operated in Half-duplex mode send and receive data in different rates. The user side sends data at a slower speed but received data from the main computer at a higher rate. The reason of this arrangement is the old modems did not have echo-cancellation function. Our telephone system is designed such that a portion of the signal sends out always comes back like an echo. However, our computers do not like echo. Therefore, old modems use different carrier frequencies for the coming-in and going-out signals. The user side uses a lower carrier frequency and a lower data transmission rate to send data. Then each side will look at the signal at the designated carrier frequency only and the echo will not be mistaken as genuine signal from the other side. (Note : the echo I talk about here is an electrical echo, not an echo generated by the software.) Very often, we will come across the terms " CCITT", "V.32bis" or "V.22". CCITT means Consultative Committee for International Telephone and Telecommunications Union. "V.32bis" and "V.22" etc. are the codes for various modem standards (or protocols). They define all the technical details and functionality of a modem. The italics "bis" is Latin word which means secondary. Therefore, V32bis is basically a V.32 with enhancement. Since each standard has its own features and functionality, modems of different standards , eg. V.32 and V.22, cannot communicate with each other. You must have a modem which can operate under different standards or you know that the modem at the other side is of the same protocol. The modems today are designed to be compatible with many different standards. When a modem receives a telephone ring, it replies by sending out the carrier signal of the highest speed protocol it can support. After 15 seconds, if it does not receive the same carrier frequency from the other side, it re-tries with the carrier frequency of the next lower speed protocol. This is called auto-fallback. If the same carrier is received, the two modems start talk to each other about features they can support. For example, they will try find out whether the other side has error correction or build-in data compression. If you are using a slow modem and are calling a high speed modem, the other side will take a long while to lower its speed to yours. Therefore, it is a good practice to enable the speaker during the connection phase. If you hear the carrier tone but your computer reports an error "no carrier detected", you should set a bigger value for the S7 register in your modem. The S7 register control how long the modem will wait for a carrier.

"Baud: and "bps" are another common terms we will see. "Baud" is the signaling rate of a modem while "bps" stands for bit-per-second and is the data transmission rate. If a modem encodes 4 bits onto every sinewave it sends out, then the bps is four times the baud rate. Over these years, the baud rate remains unchanged because it is limited by the 3.3kHz bandwidth of our telephone system. As I said, sophisticated encoding algorithm puts many bits onto every sinewave it sends out and pushes up the "bps" rate. Furthermore, the use of build-in data compression pushes the effective data transfer rate higher. The best compression ratio is 4:1. The actual performance is lower in practice. Since the modem has a buffer inside and a flow control mechanism between the modem and your computer, you may program your COM port to use a data rate which is 4 times the "bps" of your modem. For example, if you are using a 28.8K modem, you may configure your communication software to use a data rate of 115K bps. Unfortunately, the COM ports of some of the old PC have a maximum data rate of 19.2K only. Thus, don't use an external 28.8K modem. Internal modems have their own COM ports build into the modem cards. Thus, the higher data rates are always supported.

At this moment, there are two major data compression standards. They are the MNP-5 and the V.42bis. The MNP-5 is a standard of Microcom. It was a very popular standard. V.42bis is a newcomer but its compression algorithm is more efficient.

Modems nowadays are called "intelligence modems" because the users can send a range of commands to the modems to program their behaviour. Hayes is one of the pioneers in the making of intelligence modems. The term "Hayes compatible" means the command set of a modem is similar to that of the Hayes modem. Very often, a communication software will ask the user to input an "initialization string". They are the commands used to program the behaviour of a modem. Usually, the modems we use will extend the Hayes command set to include new features. If you have two Hayes compatible modems from two manufacturers, their initialization strings may be slightly different from each other. Therefore, you must look at the manual and use the suitable commands. Most of the commands in the manual are self explained. However, there are a few commands which might be unfamiliar to computer people who has little knowledge in our telephone system.

To start a connection, we issue a Hayes command "ATDT9,1234567". "AT" means attention. "DT" means tone dialing. "9" is the digit dial to access the outside line. ",," means pause for a while to wait for an outside line before continue dialing the digits "1234567". Sometime, you might have to put in ",," to wait for a longer while for an outside line. After a intelligence modem has received the command, it will go off hook, wait for a dial tone, dial the digits "9", pause, dial "1234567" again, wait for a carrier signal from the other side, exchange information and return a "OK" message to the computer. If any of the operation fails, an error message is returned. Normally, the default (or factory) options are chosen to optimize the performance of a modem. Therefore, it is sufficient to use the default setting only. The command is "ATZ&F". "AT" means attention, "Z" means reset and "&F" means restore factory settings. However, there are a few options which desire modifications. They are :

1. Auto answer : The default is manual answering. Auto answering is enable by setting a number greater than one in the S0 register. If your phone is not a dedicated line for your computer, it is worth setting the number to a larger value, eg. 10. The advantage is when you forget to turn off your communication software, your modem will not pick up the phone before you can answer it. Once you have pick up the phone, the ringing stop and your modem will not interfere your phone call. However, your phone should not be connected to an answering machine at the same time. The command is "ATS0=10".
2. Carrier wait time : The default is 30 seconds. I have explained that a modem with auto fall-back will lower its speed once every 15 seconds during the connection phase. If your modem is a slow one, you should increase it to 60 or more. The command is "ATS7=60".
3. Carrier loss time : The default is 1.4 seconds. This number determines how long the modem will tolerate the loss of a carrier signal on the phone line. If you are not using a dedicated line, there is a chance that you or someone will pick up the phone accidentally. Therefore, it is worth to use a larger number to avoid reconnection. A waiting time of 5 seconds is recommended. The command is "ATS10=50". But the modem at the other side should has the same tolerance. Otherwise, the other side will terminate the connection.
4. Touch tone speed : This option controls the speed of dialing. The maximum value 255 is recommended. This will slow the dialing speed to 1.9 digits per second but is more reliable. The command is "ATS11=255".
5. Speaker control : The default is turning the speaker on during the connection phase. However if you like, you may turn the speaker off at all time by the command "ATM0". Alternatively, you may turn down the speaker volume only by "ATL0".
6. Response set : This option determines the kinds of response which will be reported back to the computer. The default is to enable the complete set of responses. While it is called "response set", it governs some of the error detection functions as well. The basic responses are "ok", "connect", "ring" , "no carrier" and "error". Additional responses are "no dial tone", "busy" and "no answer". If you enable these additional responses, the modem will try detect these errors as well. Sometime, the modem will mistake noise on the telephone line as these errors. Therefore, I would recommend using the basic response set only. The command is "ATX0".

If you want all these features in you modem, the initialization string is "ATZ&FS0=10S10=50S7=60S11=255X0M0". While the information here is far from complete, I hope it is helpful for the beginner to understand his/her modem manual. If you read from the beginning until this point, many thanks for your interest and patient and wish you a Happy New Year.

Enclosure: ACM-HK Membership Registration form.



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ACM Hong Kong Chapter (96/97) Membership Registration Form

Name : _____

Address : _____

Telephone no. : _____

Fax no. : _____

Email : _____

ACM Member #: _____

Do you wish your information to be included in the ACM-HK WWW
membership directory?
YES NO* (* delete as appropriate)

Comments and Suggestions (use extra sheet if necessary) :

Please return the completed form to: Dr. S.W.Ng, ACM-HK Secretary, Dept. of Electronic Engineering,
Polytechnic University, Hong Hum, Kowloon, Hong Kong.