

## Newsletter

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LIBRARY

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## PERSONNEL

Computer Resources Department staff are located in Room 2N214 unless otherwise shown below.

To call from outside BCIT, prefix these numbers by (604) 432 (e.g. (604) 432-8818).

DIRECTOR, Willy Kurz.....8245  
Secretary, Debbie Stammes .....8818  
Receptionist, Jean Macdonald.....8818

### Academic Systems Analysts

Lee Herberts (Assistant Manager).....8798  
John Fairley (Released Faculty).....8538  
Craig Larman .....8629  
Dan Low.....8268  
David Thomson.....8560

### Managers

Academic Systems, Neil McLagan.....8680  
Administrative Systems, Neil McLagan.....8680  
Data Administration, Jim Coss .....8482  
Processing Services, Ron Sproule.....8708  
Technical Support, Michael Marriott.....8683

### SERVICES:

Data Entry, Karen Tong .....(2N212)8618  
User Liaison, Rita Richardson .....8456  
User Help Centre:  
Janet Robertson, Manager ... (LIB 301)8624  
Carol Berg (Tkach),  
Education Coordinator 8628  
Michele Becket, Analyst .....8561

COMPUTER ROOM/Operators .....8246

### DIAL-UP TO COMPUTERS

off campus ( 300 bps) ..... 430-3371  
(1200 bps) ..... 435-1443  
on campus ( 300 bps) ..... 5448/5449

## PUBLISHING INFORMATION

The Computer Resources Newsletter is published by the Computer Resources Department of BCIT.

Contributions to the Newsletter and comments from our readers are welcome. Address correspondence to:

Editor, Computer Resources Newsletter,  
BCIT Computer Resources Department,  
3700 Willingdon Avenue,  
Burnaby, B.C. V5G 3H2

Subscription changes may be requested by completing the form on the last page. You are subscribed if your name appears on the label attached to the Newsletter. The next issue is planned for 86:03:03.

## FACILITIES

### IBM 3083-EX1

- 24 megabyte main memory
- fourteen 571 megabyte disk drives
- four 1600/6250 BPI tape drives
- 340 terminals and two CAD workstations
- VM/CMS and VSE operating systems
- batch and online processing
- academic and administrative processing

### Hewlett-Packard (HP) 3000/64 minicomputer

- 2 megabyte main memory
- 64 terminals
- one 404 megabyte disk drive
- one 64 megabyte disk drive
- one 1600 BPI tape drive
- MPE operating system
- introductory programming and application package training

### Microcomputers

- twenty (20) Apple II+
- seven ( 7) IBM PC
- twelve (12) Zenith Z-150
- student instructional use

### Intergraph System

- DEC VAX 11/751 Central Processing Unit
- 5 megabyte main memory
- two 300 megabyte removable-pack disk drives
- one 160 megabyte Winchester-type disk drive
- one 1600 BPI tape drive
- ten single-screen graphics workstations
- one dual-screen graphics workstation
- ten alphanumeric terminals
- three desk-top electrostatic plotters
- one 24-inch electrostatic plotter

### Further information:

- IBM, HP and microcomputer facilities:  
contact Lee Korman, Assistant Manager - Computer  
Operations (local 8351)

### Locations

#### IBM 3083:

##### Student Terminal Labs:

IBM 3278.....2N329  
Memorex 2078.....2N419  
Televideo 950.....2N420/421  
IBM 3178 and IBM 3279.....2N327  
IBM 3250 CAD stations .....2N319

### Faculty Area (Computer Resources Foyer):

one HP125 terminal,  
one IBM 3178 terminal,  
one Televideo 950 terminal ..... 2N210

### HP3000:

Student Terminal Labs.....2N322/2N325

### Microcomputers

\*APPLE Cart ..... Library  
APPLE Student Lab ..... 2N321  
IBM PC/Zenith Student Lab ..... 2N318

Intergraph System Labs .....1P101,1P102

\*Access to the Apple Carts can be arranged at the Library Reference Desk.



## EDITORIAL MESSAGE

Season's Greetings! 'Tis the season to be jolly ...

This year is rapidly drawing to a close. Many changes have occurred at BCIT.

As a result of increasing interest in micro-mainframe links, we are focusing on data communications and FACILITIES and NETWORK, the section of Processing Services responsible for this function.

Computer Resources have had dial-in facilities for faculty and home-bound students since 1979. These facilities have now been expanded to allow all students with a terminal and a modem to access the IBM 3083 and HP3000 systems. Refer to the articles on Kermit and on dial-in facilities for more details.

Dan Low, Editor

## NOTICES

### The PROFILE EXEC

A PROFILE EXEC is a CMS file with the filename PROFILE and filetype EXEC. A PROFILE EXEC contains the CP and CMS commands that are automatically executed each time you logon to the CMS system.

Every user of the IBM CMS system is given a PROFILE EXEC when their CMS ID is created. Computer Resources defines the statements in the PROFILE EXEC based upon the requested needs. Most people do not touch their PROFILE EXEC but there is no way of preventing you from changing or erasing your PROFILE EXEC. Some people change their PROFILE EXEC without understanding the consequences. This makes problem resolution difficult.

If your PROFILE EXEC does not meet your needs, please contact Academic Systems (if you are a faculty member) or the User Help Centre (if you are a member of the administrative staff) BEFORE you make any changes.

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### Dial-ups For Everyone

Recent changes make it easier to access Computer Resources systems from off campus. The first change is that the dial-up lines to the HP or the IBM systems can now handle 1200 bps (bits per second) as well as 300 bps.

For 300 bps service, dial 430-3371.  
For 1200 bps service, dial 435-1443.

Once dialled in, the procedure is unchanged. See the BCIT Data Communications Guide for more information.

The second change is an improvement in full-screen support for some types of asynchronous terminals. For Televideo 950, Wyse 50 or IBM 3161 terminals, or IBM PC-compatible microcomputers running the IBM 3101 Emulation package, the new IBM 7171 Protocol Converter provides full-screen support which is better than the old SIM3278 software.

When you see the "Request:" prompt, type 7171 followed by carriage-return, to use this new feature.

If you have problems, please contact Academic Systems.

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### Artificial Intelligence Satellite Symposium

On 85:11:13, Texas Instruments sponsored a satellite symposium on "Knowledge-based Systems and Their Applications". It includes presentations by important artificial intelligence (AI) luminaries such as Dr. Edward Feigenbaum on the growing use of knowledge-based (expert) systems in industry and academic research.

Computer Resources arranged the taping of this 7-hour show with the help of Rick Long (Computer Systems) and the BCIT Library. We hope to arrange a showing in December of the highlights of this show, and for the permanent storage of this tape with the Library.

Please contact Craig Larman (8629), Computer Resources, for more information.

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### USER HELP Courses To Help You

#### \* PROFS for Beginners

You will learn how to log on and log off, use the keyboard, understand the functions on the main menus, manage your personal files and access DOBIS and ISIS.

#### \* Advanced PROFS

You will learn how to create nicknames, distribution lists, and names for your files. You will also become proficient in using "dot" commands, managing your personal storage, and manipulating printer screens and control files.

#### \* CMS for Beginners

You will learn how to use the keyboard, create documents view, edit, print, send and receive files. You will also learn basic CMS commands to manipulate your data.

#### \* Micros For Beginners

You will use an IBM PC or Zenith Z-150 microcomputer and the disk operating system (DOS). This course will teach you how to use basic DOS commands to run special software packages.



If you would like other courses, please give us a call. Also, if you'd like us to design a course especially for your department, please come and see us in the Library Room 301. (The User Help Centre may be moving again, so please call to double check where we're located!)

If you are interested in attending one or more courses, please call Carol Berg (Tkach) at local 8628 to set up a time. Remember all of these courses give you hands-on experience. Please let us know if you are planning to attend so we can make sure we have the necessary number of terminals and, if applicable, diskettes.

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#### Computers For Lunch

We've been getting together to share ideas and talk about what's going on in computing over lunch -- on the third Wednesday of every month. In September, we had a panel discussion on CBL, Academic Systems, Micros, Library, and ISIS. About 15 people participated in the discussion. In October, we presented office automation concentrating on our mainframe systems - PROFS and FOCUS. There were over 25 people at this session so we feel there is lots of interest. We took notes at each session so we can follow-up on the issues raised. If you would like to receive a copy, please contact the User Help Centre at local 8628.

Special thanks to Frank Knor (Library) and Ann Brown (Computer Resources) for making presentations at the November session. Unfortunately, Paula Pick, Project Leader for the DOBIS system was sick. Paula was going to talk on the ELECTRONIC library of today and tomorrow. Instead, Frank and Ann gave an informative talk on the DOBIS system. A demonstration of the system was given with a brief explanation of subject, title, and author searches. The audience was interested in learning about DOBIS and expressed a keen interest in expanded searches, boolean logic and accessing other library data bases such as Dialog.

The following sessions in Room 2N320 from 12:00 - 13:00 are planned:

- |  |             |
|--|-------------|
| * Surprise                             | December 18 |
| * Artificial Intelligence Applications | January 15  |
| * Optical Scanner/Mailing Lists        | February 19 |
| * BCIT Open House                      | March 19    |
| * 4th Generation Languages             | April 16    |

If you have any suggestions on topics you'd like to see covered, please let us know. We hope to see you on the third Wednesday of every month!

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#### Fall Computer Shows

Computer Resources participated in two Computer Shows this Fall. The first was the SFU "Computers in Education" show, sponsored by the SFU Commerce Students, in late September. DOBIS, ISIS, FOCUS and PROFS were demonstrated on the IBM 3083 and Landsat (Surveying) and Tencore (CBL), on PC's.

The second show was the Office Automation Show at BC Place held in early November. DOBIS and PROFS were demonstrated. At both shows, we dialed into the IBM 3083 over phone lines with Wyse terminals and Hayes 1200 bps Smartmodems. The general public was impressed with the ability to access a mainframe computer located several miles away!

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#### Hardware Problem Report

On the IBM 3083, an unexplainable error occurred on 85:10:09. The IBM 3083 was down for 40 minutes while the VM system was restarted (re-IP'ed).

On the HP3000 system, two serious problems were identified. The first has to do with the logon process. A design limitation results in long delays when more than 14 students attempt to logon at the same time. This problem is being addressed by Hewlett-Packard (HP) and will be resolved in their next software update.

The second problem is that of "ghosts"; i.e. the HP system is losing track of terminals on a random basis. Investigation indicated a problem in a chip controlling port access. HP has resolved this problem by replacing some chips.

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#### Integration Through Communication

To accommodate the administrative requirements for the NEW BCIT, terminal access to the IBM mainframe was installed in the North Campus. This first phase includes a combination of 32 terminals and printers.

PROFS, the Professional Office System, is the first system being used to integrate PVI and BCIT. The senior staff have been trained and are now sending notes, scheduling their activities, and managing their files. By joining the PROFS network, they can communicate with other PROFS users scattered throughout the north and south campuses.

This was very useful for our President and Vice-Presidents because they were operating out of offices located on both campuses. Throughout this transition period, PROFS will help our managers access their information anywhere there is a terminal to the IBM 3083. By expanding the PROFS network, we are bringing people closer together. Integration through Communication spells PROFS - BCIT's exciting office system.

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### Did You Know?

The Vancouver School Board has approximately 850 micros, mostly Commodore 64s. The majority were purchased through Hot Dog Drives and fundraisers at the school level.

Selkirk College has a program for computer applications in the Forestry industry.

The Vancouver PC User's Group meets each third Wednesday of each month at BCIT (Room 1A197).

BC Commodore club can be reached at 738-3311 for a recorded message.

MacIntosh users at UBC must clean their mice every 10 days (especially the moving ball).

The BC Provincial Computer Science 12 curriculum will begin in September 1986.

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### Janet's Leaving

Janet Robertson, User Help Centre Manager, will be taking a leave of absence for one year. Janet will be using her project management, Admissions, and leadership experience to implement ISIS at a California college. We look forward to the contacts and knowledge she will bring back to BCIT. At this time, Janet's replacement has not been named.

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## HARDWARE CHANGES

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### Moving of Terminals (CRT's) and/or Printers

Relocation of terminals/printers used to access the IBM mainframe should only be performed by Computer Operations. If assistance is required, please contact Lee Korman (432-8351) or Computer Operations (432-8246).

There are three reasons for this request:

1. These devices have been set up to access the different systems (PROFS, DOBIS, etc.) through the coaxial cable connected to the terminal/printer. If the device is moved without first notifying Computer Operations, there is no guarantee that it will work. The BCIT logo may be present but the systems previously accessed could now be unavailable.
2. Terminals and printers are cross-charged. If a device is relocated without first notifying Computer Operations, the last known department or individual who had the terminal would continue to be charged.

3. Maintenance calls for problem terminals/printers are recorded by the serial number which is cross-referenced with the location of the device. If the device was to be moved, there would be a considerable delay obtaining service on the problem device as determining the device's last location would have to be performed first.

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### IBM Terminal (CRT) Trouble Shooting

The following procedure applies to IBM 317x, 327x and Memorex terminals. If the terminal is not working, please follow the steps outlined below to correct the problem. If after checking all the items listed and the terminal fails to respond with a BCIT logo, contact Computer Operations (432-8246) to report the problem.

If any assistance is required or if you have any questions, please contact, Lee Korman (432-8351) or Computer Operations (432-8246).

1. Shut the terminal off.
2. Check that the power cord is plugged in at the electrical outlet and at the back of the terminal.
3. Check that the COAXIAL CABLE connection at the back of the IBM 3178/3179 terminal (or front of the IBM 3278 terminal) is secure. The connector is a PUSH-TWIST type.
4. Turn terminal on.
5. Check that the BRIGHTNESS control knob is turned on. It is marked by the ☼ symbol. On IBM 3270-type terminals, it is on the lower right hand side of the screen bezel. On IBM 3170-type terminals, it is a thumbwheel below the screen.
6. If the CURSOR is at the top RIGHT HAND CORNER and there is a line at the bottom going straight across the the screen and nothing else, this could indicate a communication problem.

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### 7171 and The Televideo Lab

Following the installation of the IBM 7171 protocol converter, the Televideo terminals in Rooms 2N420 and 2N421 were switched to access the IBM 3083 via the 7171 rather than the Memorex 1270 communications controller. The 7171 allows the Televideo terminals to emulate IBM 3270-type terminals and provides a fast communications rate of 19,200 bits per second (bps).

There are also five IBM 3161 asynchronous terminals in the Televideo Labs. These replace five Televideo terminals that were temporarily relocated to the HP terminal lab, replacing HP terminals that were beyond repair.

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## SOFTWARE CHANGES

### CMS SUGGEST EXEC

A new CMS EXEC (courtesy of York University) has been installed to enable faculty and students to send suggestions or questions to Computer Resources electronically (PROFS users can already do this.) These suggestions/questions and responses may be posted (at the discretion of the Duty Analyst) to a "bulletin board" which can be browsed by others. Hence, these suggestions/questions should pertain to CMS and be of interest to other CMS users.

To use, simply type SUGGEST and then fill in the screen presented to you. Press the PF5 key to send the suggestion/question to Academic Systems which will answer outstanding questions at the beginning of each day. An answer will be sent to your CMS ID and may be posted on the bulletin board.

To browse the bulletin board, type SUGGEST BROWSE.

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### New Release of VSE

A new release of IBM's VSE operating system, VSE/SP Version 2 Release 1.2, is installed and is being tested by Computer Resources. Implementation dates for this new release are 86:01:15 for the Administrative system (ADOS), and 86:05:01 for the Student system (SDOS).

New features in this release include:

- 40 MByte virtual memory size
- new all inclusive VSAM-based Librarian system
- new release of CICS 1.6.1
- conditional JCL statements
- additional hardware support

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### Printing On CMS

Two new programs are available for faculty and staff use of approximately 24 printers located around the campus.

For non-SCRIPT/DCF files, use MPRT (Michael Print). MPRT is invoked from CMS as follows:

MPRT filename filetype filemode (PRT x

or from FILELIST/FLIST:

MPRT /(PRT x

where "filename filetype filemode" is the CMS file name and "x" is the destination printer number. For example

PRT 2 will print on the student lab printer, PRT 3 will print on the instructor foyer (2N214) printer. Putting "CC" before the PRT option, will provide carriage control for LISTING files. To see which printers are available, do the following:

MPRT filename filetype filemode (PRT ?

or MPRT (PRT ? (from FILELIST/FLIST)

Using this format, you can also choose printer options (such as italics for the laser printers) via menus. Please be careful when choosing a printer, as your print job may interfere with departmental print jobs (e.g. Personnel).

For SCRIPT documents, simply type DOC. The DOC program is powerful; supplying printer choices, proofreading, on-line proof displays, file lists and editing features via a menu display.

For security reasons, MPRT and DOC are not available to students. Students should use the existing PRT program for printing CMS files. For further information on MPRT or DOC programs, contact the User Help Centre at local 8561.

### Exam Creation, Printing and Marking

A new comprehensive system for extracting, printing, and marking exams will be in operation 86:01:06. The system, called PAT, performs the following:

- \* extracts questions by either browsing or question number from a question database to form an exam
- \* prints these exams in scrambled (each student gets the questions in a different order) or unscrambled form
- \* marks these exams from optical scanning sheets.

There are several advantages of PAT over existing TESTANAL and CAMP systems. PAT has the following improvements:

- \* maximum 120 questions (up from 55)
- \* maximum 500 students (up from 300)
- \* any number of questions may be easily deleted from analysis
- \* each question may have different weights/marks
- \* correct factor for guessing is optional
- \* exams can be printed on white paper for improved clarity
- \* marking output includes item analysis, two copies of marks (raw and percentage) sorted by student name, two copies of marks sorted by student ID, and histogram.

To use PAT, you must:

1. obtain a CMS ID from Computer Resources (local 8624 or Room 2N214 to get a form). PAT runs on the IBM mainframe.



2. have questions (maximum length 30 lines) in either PC or IBM mainframe form. Optionally, Data Entry can enter your questions for you.
3. learn three CMS commands (LOGON, PAT, LOGOFF) to use the menu-driven system for question extraction and exam creation

About 70,000 sheets are scanned annually for exams, course evaluations, and surveys. Further information on PAT may be obtained from Data Entry, local 8618, Room 2N210.

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## FEATURES

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### Focus on FACILITIES and NETWORK

With the rapid growth of Computer Resources in the recent years, new areas of concern developed and had to be addressed from a management point of view.

Two such areas are Facilities and Network. Provision has been made for a group in Processing Services to deal with security, new installations and physical planning as well as network control, development and expansion. The Assistant Manager for these areas is Zdenek Prochaska.

An access control system has been installed to all the sensitive areas such as the machine room, data control and the main entrance to Computer Resources. Access is gained by introducing a personalized magnetic strip card into each door card reader. The system compares the data on the card to the user's file before unlocking the door. The user ID and the access time are stored and could be displayed on demand. This way only authorized personnel gains access and a record is kept about all people entering the premises. A battery back-up keeps the system operational in the event of power failure.

Frequent disappearance of expensive equipment such as micros, disk drives, etc. prompted installation of an automated alarm system in student labs. Developed at BCIT by Jim Hayes (Electrical), the system alerts campus security when someone tampers with the equipment.

With hundreds of pieces of equipment scattered throughout the campus, tracking and control of the hardware as well as maintenance contracts is presently under review. Fully computerized inventory control should be in place by the end of this year.

To protect against serious consequences of hardware malfunctions, the equipment within the machine room is protected by a halon fire suppression system and fire drills are held periodically. The function of vital organs such as the air conditioning and the water chiller is being constantly monitored. In the off-hours a remote alarm alerts Security and/or the technicians who, in turn, page the manager responsible should the problem be of more serious nature.

Over the years the BCIT computer system developed from a simple IBM 360/30 to a complex system comprised of an IBM 3083 mainframe and a HP3000/64 minicomputer. The computer centre moved to the existing premises in 1975 and almost every second year since, renovations were necessary to accommodate the rapid growth. Now, with the BCIT - PVI merger, the Facilities group is facing another challenge -- to propose a new layout of the premises to meet the requirements of equipment maintenance contracts (IBM does not like having IBM 3274 control units stacked on top of one another) and to provide personnel with adequate work space. The project involves space allocation, air conditioning and raised floors, adequate power supply and cabling for computer and communication equipment. Security will be expanded and the final move will have to be accomplished with minimum disruption of service.

The Computer Resources network supports over 400 terminals and printers. A total of 13 IBM 3274 terminal control units and a new IBM 7171 protocol converter enable users to communicate with the IBM 3083 mainframe. Users can access both the IBM and the HP 3000 computers through telephone dial-up lines via the Develcon Data-switch unit. A direct communication line services the downtown BCIT offices. Further rapid growth of the existing network is expected as BCIT merges with PVI and expands beyond the Willingdon campus. Establishment of a local area network (LAN) is under consideration and care is being taken that new premises and renovated areas are properly wired and cabled in advance.

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### KERMIT

As microcomputers spread throughout BCIT, the demand increases for better micro-to-mainframe communication. One software package which can move data between a diskette file on a micro and the file system of a host computer is called Kermit.

Kermit is a public domain program, developed at Columbia University and available from the BCIT Library on diskette (IBM PC or Apple DOS 3.3). Copies may be made for non-profit use. Donations may be sent to Columbia University to support continued enhancement of Kermit.

To demonstrate how Kermit can be used at BCIT, assume you have a source program file on the HP3000 named MARYPROG, which you wish to copy to a diskette on an IBM PC through a 1200 bit per second (bps) dial-up connection. The reason may be to save the program for future use, to run it on a micro or to mail a copy to a friend.

To transfer, or "download", this file, follow these steps. (Type the lower case fields as shown. Comments and instructions are enclosed in parentheses.)

1. A> mskermi (Load MSKERMIT, the version for MSDOS on the PC.)
2. MSKERMIT> set parity even (Set appropriate parity.)  
MSKERMIT> set baud 1200 (Set appropriate baud rate.)
3. MSKERMIT> connect (Enter communications mode.)
4. Dial the connection and log in to the HP3000.



5. : run kermit.pub.kermit

(Execute KERMIT/3000, the version of Kermit on the HP3000.)

6. KERMIT/3000> send maryprog

(To instruct Kermit/3000 to send the file over the telephone line in a series of packets.

For each packet sent, the sending Kermit expects to receive an acknowledgement or "received with no errors" packet. When acknowledgement is received, it proceeds with the next packet. If an error is suspected, Kermit re-transmits the previous packet. The success of this operation requires that the two versions of Kermit recognize each other's packets (i.e. they use the same "protocol").

7. KERMIT/3000> <CTRL> ] c (<CTRL> is the CTRL key.)

(To return to "microcomputer mode" to set MSKERMIT to receive commands. You will now have the "MSKERMIT" prompt on your screen.)

8. MSKERMIT> receive b:mary.pas

(MSKERMIT now sends a "ready to receive" packet to Kermit/3000 and the data will be stored in the file MARY.PAS on the B drive. While the two systems are transferring the file, the microcomputer monitor displays the status of the transfer, including how many kilobytes have been transferred so far and how many re-transmissions have been required.)

9. MSKERMIT> connect (When the data transfer is complete, reconnect to the host.)

10. KERMIT/3000> exit (Exit KERMIT/3000.)

11. : bye (Logoff from the HP3000.)

12. <CTRL> ] c (Escape to "local" KERMIT.)

13. MSKERMIT> exit (Exit from MSKERMIT.)

14. A> (You are now in DOS.)

Both MSKERMIT and Kermit/3000 support a large number of commands and options. For most purposes, SEND, RECEIVE, CONNECT and SET, the escape code described above, and ? (help) will be sufficient.

Kermit is also available on the IBM 3083. Its use is analogous to that described above.

To transfer a file from the microcomputer to the HP3000 or the IBM 3083, the roles are reversed. Now the microcomputer Kermit "sends" and the HP or IBM Kermit receives.

For more detailed information, refer to the Data Communications Guide available from the Computer Resources Receptionist (Room 2N214).

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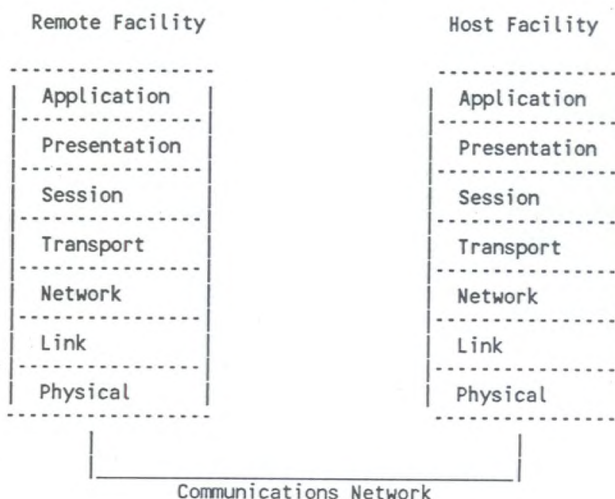
#### The OSI Model

Superficially, data communications appears simple. You access a remote computer via the telephone system with a terminal (or microcomputer functioning as a terminal) and a modem by simply dialing the telephone

number of the computer and logging on as if you were a local user. What could be simpler?

However, examination in detail reveals many levels of complexity. We assume that you know how to log on to a computer system, that you have acquired the necessary hardware and software, that the telephone system can link you to the host computer and that the proper hardware and software exist on the host computer.

The International Standards Organisation (ISO) recognized the need and importance in exchanging information between and within networks and across geographical boundaries. In 1978, the ISO developed a model, the Open Systems Interconnection (OSI), to establish standards for the various components or "layers" in data communication systems as shown below.



Physical Control defines the electrical and mechanical aspects of interfacing to a medium for transmitting data. This includes the interface cabling conforming to the RS-232-C and RS-449 standards, the modems and the associated software.

Link Control governs the presentation of data to the physical channel; it defines a protocol, a set sequence of codes defining a block of data, for transmission. Link Control software at the transmitter prepares data for transmission, monitors the channel for transmission errors, manages access to the channel and ensures proper sequence of the transmitted data. At the receiving site, the Link Control software removes the control codes from the data block before passing the data on to higher levels. When functional, Link Control is transparent to all higher levels and to you, the end-user.

Link protocols are the lowest-level protocols -- asynchronous or synchronous. In most asynchronous communications packages, e.g. Kermit and CROSSTALK -- you can define data link parameters such as the number of start bits, data bits, stop bits, parity and speed to match the requirements of the host computer system. Synchronous data link control protocols include binary synchronous (bisync), synchronous data link control (SDLC) and high-level data link control (HDLC). Synchronous protocols are used primarily in dedicated data communications networks such as business or military which are subject to high data volumes.



Network Control sets up the path between communicating nodes, routes the data across intervening nodes to the destination node and controls the data flow between nodes. A node is any site (computer or switching centre) in the telecommunications network. In telecommunications systems, this function is primarily performed by the common carrier. For example, if you were to dial-in to a computer in Toronto from Vancouver using DATAPAC (a service provided by Telecom Canada), the intervening telephone companies determine the communications path. The telephone link may be Vancouver--Calgary--Regina--Winnipeg--Thunder Bay--Toronto. Each data block may travel along a different route. If the link from Calgary to Regina is "blocked", the data could be routed through Saskatoon. In a packet-switching network, each data block is "tagged" with a destination and sequence number. Network control software ensures that the data blocks are received in the proper sequence at the destination.

Transport Control governs a communication session once the path is established. It allows reliable data exchange independent of the type of systems that are communicating and where they are in the network.

Session Control presents the system-dependent aspects of communicating between specific nodes in the network and bridges the gap between the services of the transport layer and the functions of the operating systems of the communicating computers. (A session is the duration a remote facility is linked to a host computer for data transfer.) Session control defines the process of setting up or terminating a communications session and checks whether or not proper communications is taking place. When errors occur, it must restore the session without data loss or terminate the session in accordance with specified rules. Communications software at the receiving computer must be able to detect errors and that at the originating computer be able to retransmit data when required and be able to terminate the session when retransmissions are unacceptably high.

Presentation Control defines the character set and data code used for communication. Printer and screen displays are controlled by this layer. Conversion of character sets is performed when required (e.g. EBCDIC, the IBM mainframe standard character set, to ASCII, the American Standard Code for Information Interchange -- the character set used by other vendors).

Applications Control provides user application tasks. Some services are resource sharing, file transfers, remote file access, database management and network management. For example, if you dialed in to the BCIT IBM system and used XEDIT to access a file for processing, XEDIT is the applications control program. At the remote terminal, you require software to display data received from the host and to transmit keyboard strokes to the host.

Separation into these logical layers facilitates portability and standardization of software and hardware. It also assists in problem resolution.

Each layer depends on the layers below it. For example, if the cable connectors do not fit, the Physical Control will not be intact and none of the higher levels will work.

If you dialed in to the BCIT IBM VM/CMS system and want to do full-screen emulation on your microcomputer, then you must have software to provide IBM 3270 emulation; i.e. the Presentation Control of each facility must be compatible.

Vendors often design communication packages to provide the Link, Session and Presentation Control functions within one package. Kermit even provides an Application-level function -- file transfers. The separation between layers is usually transparent to the user.

For successful data communication, each layer of the OSI model must be compatible at both the remote and host computer locations. When all the components are compatible, data communications is indeed simple!

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### Networking MicroComputers

The last two years has witnessed an increasing interest in local area networks ("LANs") as a cost-efficient alternative to centralized computing, especially if there is an existing base of microcomputers.

A LAN physically links together neighbouring microcomputers, enabling them to communicate and share devices. The interest in LANs indicates a need for the shared-resource systems characteristic of multi-terminal, mainframe systems. This contrasts with the original use of micros as isolated workstations.

Most terminals on a mainframe system are essentially just communication devices. However, the "terminals" on a LAN are actually microcomputers. Thus, they retain their independence if the network fails and can still be used as separate workstations. Those who first bought a micro as a tool for word processing or spreadsheets are now discovering the potential of also using it as a communication device.

As mentioned, a LAN helps solve some microcomputer-related problems -- the sharing of resources, and communications. An expensive peripheral device (such as a laser printer or hard disk) attached to a network of microcomputers can be used by anyone on the LAN -- it is like having the peripheral device attached to their machine. LANs permit electronic mail and other data communications between the micros. Phone messages, notes and memos can be circulated quickly and more effectively than by traditional paper methods. LAN users can also reduce software costs, because vendors often provide network-wide licences at rates far less than the cost of purchasing individual copies of the same software for each member workstation. Another advantage is a multi-user database, in which many operators on the network can access and update a "community" file.

In a teaching environment, a LAN distributes the CPU processing load and relieves the demand for mainframe computer resources. It provides a cost-effective approach to give students the advantages of using a hard disk, and for the easy distribution of course data.



An area often overlooked in purchasing a LAN is that of security. In many of the available LAN products, all files on a shared hard disk are available to all micros on the network. This may be undesirable, especially if student 'hackers' are on the network. However, some LANS, such as JANET2 from Waterloo, do provide restricted access for files on the disk. In fact, JANET2 was designed for a student environment and is widely used by schools.

There is a fast growing market of LANS available for many different machines. A LAN is created with communication lines, special hardware and software, and the price reflects the complexity and power of these components. The quality of a LAN is measured in terms of data transfer speed, performance under heavy use, flexibility, expandability, links to other networks, ease of use, and other factors.

The LAN price is usually quoted for the basic software to run the network, and on a per microcomputer-node basis for any special hardware required on each micro. This, by itself, can be misleading because of varying cabling costs and options available on a LAN system. However, with that as a warning, a comparative list of some approximate LAN prices is given below:

Vendor	per node	Network Software and extras	Micro
IBM PC Network	\$1000	\$900	IBM PC
Waterloo JANET2	500	1500	"
Orchid PC Net	800	400	"
3Com Ethernet	1500	2000	"
Server EasyLan	150	in the node price	"
Apple AppleTalk	140	none needed	MacIntosh

In BC, several educational institutes are using LANS for student use. VCC has a Novell network for IBM PC's; UBC and Kwantlen are using JANET. UBC and Camosun College are also using PC Net. Within BCIT, the Marketing Management department is setting up a lab with 30 IBM PC-compatibles and a LAN from Mitek.

Micro-based LANS are moving quickly into the office and schools. They address the need for sharing data, electronic mail, and cost-efficient use of peripherals. Yet, users still have the convenience and power of their own personal computer.

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### Computers in Mining

Acquiring a computer system to teach second year mining students mine-planning techniques presented an unusual problem. All the commercially-available systems were too sophisticated; they volunteered too much! A suitable training system had to have good graphic and data-handling capabilities, yet leave all the decisions, however routine, to the student. A project, led by John Fairley (Mining), is writing the solution -- a system that stops just short of being too friendly.

Mine-planning is a catch-all term for the broad subject of designing and operating a mining operation. The analysis may be short or long-term, sophisticated or cursory, part or all of the operation. A complete package would include four major programs:

- \* data input and retrieval (eg.the geology)
- \* data modelling
- \* simulated mining of the model
- \* economic analysis of the mining schedule

Sophistication of this package would likely involve stability calculations, statistical analysis and optimization at several levels, processing models, and much more.

BCIT's version follows:

- 1) Geological, geotechnical, and survey data is entered in a logical code and format (a 'database'). Output is largely graphical (plans and sections), via graphics terminal or plotter. International Geosystems Ltd. GEOLOG was purchased for its comprehensive aspect, and the availability of some ready-made data sets from previous customers. It is the only purchased software.
- 2) Assay data from the database is computer-modelled in a classic manner which presents a regular set of blocks drawn and coded on a plotter. There are several highly sophisticated 'geostatistical' approaches to this problem that may be introduced at a later date.
- 3) Mining simulation is the process of sequentially collecting the model blocks. The student does this manually, using his geological, geotechnical, mining methods, and economics knowledge, and enters the location of the blocks, with a timing factor, into the computer. Typical commercial software streamlines or automates much of this process. The output is printed chronological totals of the quantities. These quantities will also be classified according to economics (ore and waste) and other subdivisions (eg overburden, air). Enterprising students could introduce their own subroutines (FORTRAN) in this or the previous stage for further sophistication of the simulation.
- 4) These quantities are subjected to an economic analysis, which projects a cash flow, discounts the net and gives a rate of return if the capital cost is known. Again, in comparison to commercial software the student enters income and cost data at a much more basic level. Income taxation, however, is a pre-programmed subroutine, requiring only general understanding.

These programs will be incorporated into project(s) spanning geology and mining courses in second-year mining. The present-value or rate-of-return is the 'bottom line' indicating how well the student has interpreted the geology, laid out the mining, or predicted the economics. His hard-copy plans allow constructive criticism of the decisions.

The mining technologists computer skills should obviously improve along with his geological and mine-planning skills.

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### Trivia Quiz

1. ADA is  
(a) a novel by Vladimir Nabakov  
(b) a computer language  
(c) both of the above  
(d) other
2. Lord of the Rings is:  
(a) a novel by J. R. R. Tolkien  
(b) other
3. Why can't you eat corn flakes while riding on Metro Transit?  
(a) because it is not a serial bus.  
(b) none of the above  
(c) because 30 bytes per second is too slow.
4. What is a RAM?  
(a) an unreliable and dangerous animal.  
(b) a small pickup truck.  
(c) random access memory  
(d) all of the above
5. Does the phrase "LOTUS 1-2-3" suggest to you:  
(a) the Porsche was fourth  
(b) please count slower- my leg is asleep  
(c) you need at least 4 for a bouquet  
(d) something to do with computers?

### DOCUMENTATION UPDATE

New documentation:

BCIT Minitab User's Guide (85:11:01)

Minitab is an easy-to-use statistical analysis package for the HP3000. In addition to statistical analysis, it can produce printer plots.

Revisions:

BCIT Data Communications Guide (85:12:01)

The Data Communications Guide has been revised to include descriptions on the use of Kermit.

One copy of each User Guide may be obtained from the Computer Resources Receptionist in Room 2N214.

### CMS VERSION OF NEWSLETTER

If you have a faculty or staff CMS ID, you can access a copy of the Newsletter via an IBM terminal. This file is updated with each issue of the Newsletter.

The procedure is as follows:

1. Logon to CMS.
2. Type 'NEWS' and the current version will be displayed at your terminal.
3. Use XEDIT commands to scan through the Newsletter.
4. Type 'QUIT' when you have finished.

### DUTY ANALYST'S CORNER

#### Deferring Printing on the HP3000

Q: My office is far away from the HP printer in the HP terminal room. How can I stop my job from printing on the printer when I run my job? I would like to initiate my job from my office terminal and then start the printing when I am beside the printer.

A: The solution to your problem is a utility program called SPOOK5. To satisfy your need, follow the steps below:

```
:FILE LP;DEV=LP,1 ..... define a logical file for the
                           line printer at priority 1
                           (default priority = 6)
```

- run job with printer output from remote terminal;  
log off when finished.

- go to terminal room with HP line printer; log on and  
execute SPOOK5 as shown below:

```
:RUN SPOOK5.PUB.SYS
```

```
> SHOW yourid.account;0 ..... displays all output
                                files in your ID
                                letter "0" (not zero)
```

```
> ALTER filenumber;PRI = n ... alters priority of the
                                specified output file,
                                form #0ddd; several
                                files can be specified
                                by separating with
                                commas (,); priority
                                must be greater than
                                or equal to 6.
```

```
> EXIT ..... terminates SPOOK5
```

This procedure meets your requirements. If further assistance is required, contact Academic Systems or use the SUGGEST EXEC to ask for further clarification.

### HOURS OF OPERATION

#### I. ACADEMIC SYSTEMS

The normal operating schedule is given in Table I.

TABLE I

System	Hours	Days
IBM 3083	0800 - 2300	Monday - Friday
	0900 - 1700	Saturday & Sunday
HP 3000	0700 - 2400	Monday - Thursday, Saturday & Sunday
	0700 - 2130	Friday
Micros	0700 - 2300	Monday - Sunday



On weekends, the HP3000 runs in UNATTENDED mode from 1700-2400 during the school year.

#### Computer Operations closures:

Christmas Eve : 85:12:24  
 Christmas Day : 85:12:25  
 Boxing Day : 85:12:26  
 Weekend : 85:12:28,29  
 New Year's Eve : 85:12:31  
 New Year's Day : 86:01:01

## II. ADMINISTRATIVE SYSTEMS

Table II indicates the regular hours for the administrative systems.

TABLE II

System	Hours	Days
GLOBAL/CHRIS	0800 - 1800	Monday - Friday
	unavailable	Saturday, Sunday
DOBIS	0730 - 2230	Monday-Thursday
	0730 - 1900	Friday
	1000 - 1800	Saturday, Sunday
ISIS	0830 - 2030	Monday-Thursday
	0830 - 1630	Friday
	0830 - 1230	Saturday
	unavailable	Sunday
PROFS	0730 - 2300	Monday-Sunday

#### December Schedule:

DOBIS : Last weekend open - 85:12:07,08  
 First weekend open - 86:01:11,12  
 December 16-20,23,27,30,2,3 - 8:00 - 5:00  
 Regular hours resume 86:01:06

ISIS : Regular hours to 85:12:07; resume 86:01:06  
 UNAVAILABLE : 85:12:08,28,29  
                   86:01:04,05  
 0830-1630 : 85:12:07,14,15,21,22  
 0830-2100 : 85:12:09-13,16-18,23,27,30  
                   86:01:02,03  
 0830-2400 : 85:12:19,20

Hours of Operation for all systems (academic and administrative) are noted on the CMS Logon message. Exceptions to the posted hours will be noted on the CMS Logon message.

The CMS Logon message display is in two parts. The first part will be displayed every time you log on to CMS. Temporary changes to scheduled hours, system downtimes, or new releases of system software packages will be noted on the first part of the CMS logon message.

The second part of the CMS Logon Message will only be displayed when Q LOGMSG is entered. This will display all regular system scheduled hours and any long term information about scheduled holiday hours, system downtimes for maintenance, planned system software/hardware upgrades, etc.

## LAB BOOKING

The IBM terminal labs and the HP terminal lab 2N322 are for scramble use only.

The HP125 CRT terminals in Room 2N325 may be reserved by instructors of courses which use packages requiring the use of the HP125 terminals.

Room 2N325 and the Microcomputer Labs (Rooms 2N318 and 2N321) may be booked through Timetabling (Room 107, Trailer 2V, local 5386). In non-booked times, Room 2N321 is open for scramble use.

## MAINTENANCE

Computer Resources maintains equipment in the table below. In case of problems, call 432-8246 (local 8246).

Micro/Terminal Labs	Locations
APPLE II+	2N321
IBM PC / Zenith	2N318
IBM 3083 system	2N419, 2N420, 2N421 2N329, 2N327, 2N319
HP3000 system	2N322, 2N325

#### Scheduled Preventive Maintenance (P.M.):

HP3000 System:  
 85:12:16 -- (0800 - 1400)

## SUPPLIES

Computer Resources stocks supplies for the student labs. Ribbons will be replaced during daily checks. Report supply shortages to Computer Operations (432-8246).

Print Layout Sheets are supplied by Computer Resources and are available in Room 2N327. Coding forms are NOT supplied but may be purchased at the campus TNT (This 'n That) stores.

#### Central Stores provides:

- 5 1/4 inch diskettes:
  - double-sided, double-density for the IBM PC and compatibles
  - single-sided, double-density for the APPLE II+
- paper and ribbons for microcomputers
- scanner sheets (5-bubble and 10-bubble)



NEWSLETTER SUBSCRIPTION

\_\_\_\_\_ ADD my name to your MAILING LIST

\_\_\_\_\_ CHANGE my mailing label information  
(I have attached my mailing label and indicated the  
changes below.)

\_\_\_\_\_ REMOVE MY NAME (I have attached my mailing label.)

MAILING LABEL INFORMATION ( Please print. )

NAME/TITLE: \_\_\_\_\_  
last first

MAILING ADDRESS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Postal/ZIP Code \_\_\_\_\_

Business Phone: \_\_\_\_\_

Date: \_\_\_\_\_ Signature: \_\_\_\_\_

FEEDBACK

If you have a comment or a suggestion about any of our  
services, we would like to hear from you. Please take  
the time to jot it down and return this form to us.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



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TO: Editor, Newsletter  
BCIT Computer Resources Department  
3700 Willingdon Avenue  
Burnaby, B.C. Canada V5G 3H2

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Please fold