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HOSTCM for VAX/VMS

The Waterloo micro language interpreters for the Commodore SuperPET and IBM Personal Computer support a communications protocol designed by the University of Waterloo which allows programs executing on the microcomputer to access files residing on a host computer. The microcomputer is connected to the host computer via an RS-232C communications line and converses with a program called HOSTCM running on the host. Versions of the HOSTCM program which run on IBM 370 computers with VM/CMS and DEC pdpll computers with RSTS/E have been available for several months. Now a version of HOSTCM which runs in native mode on DEC VAX computers with the VMS operating system is also available. Once the HOSTCM connection to the VAX is made, programs on the microcomputer can read and update files on the VAX. In addition, if Digital's DECnet program product has been installed, files on other network machines can also be accessed.

The VAX/VMS version of HOSTCM is distributed by WATSOFT Products Inc. Ordering information can be obtained from WATSOFT at the address given later in this newsletter. A description of the HOSTCM protocol is available from the Computer Systems Group at the University of Waterloo for those who wish to develop HOSTCM programs for machines other than those currently supported.

Printing with Waterloo Software

The Waterloo micro language interpreters view the printer in a manner consistent with the method of access to files on disk. Hence commands and statements which reference the printer are independent of the computer being used. However, the filename used to access the printer depends upon the type of printer and how it is attached to the computer.

On the SuperPET, printers can be attached via the IEEE-488 bus or the RS-232C serial port. Printers on the IBM Personal Computer can be attached via either the parallel printer port or the RS-232C serial port. Under VM/370 CMS, the Waterloo languages use the virtual printer defined for the virtual machine. The file name "printer" should be specified when using a Commodore printer such as the CBM 4022 with a SuperPET, when using the IBM matrix printer with the IBM Personal Computer, or when using the virtual printer on VM/CMS. If a printer is attached via the serial port to either of the above two microcomputers, the file name "serial" should be used.

On the SuperPET, confusion sometimes arises because of the character set representation, called "PET ASCII", supported by Commodore printers. The Waterloo software uses standard ASCII internally for compatibility with other computers and devices; however, the SuperPET version of the Waterloo software translates characters from standard ASCII to PET ASCII when writing to device "printer". If a printer attached via the IEEE-488 bus uses standard ASCII, this translation will not produce desirable results. In this case, the filename used to refer to the printer should be "ieeex" where "x" is replaced by the primary address of the printer. For example, output sent to a device designated by the filename "ieee4" is not translated.

1. Listing Programs

With the above information in mind, we can describe how to obtain listings of programs in each of the languages.

In Waterloo microBASIC, a program listing can be produced by loading the desired program and issuing the command

    save "printer"

where "printer" can be replaced by "serial" or "ieee4" depending upon the type of printer being used.

For Waterloo microCOBOL, microFORTRAN, microPascal, or the microEditor, the current file being processed can be printed by issuing the editor command

    put "printer"

replacing "printer" with "serial" or "ieee4" where necessary. A disk file containing printable data can be printed with the editor command

    copy "filename" to "printer"

These two methods of printing can also be used from Waterloo microBASIC after entering the microEditor with the EDIT command.

Printing APL functions requires a printer which supports the APL character set. In the case of the IBM Personal Computer, the Waterloo APL character generator ROM can be installed in the matrix printer (model number 5152). Printers with optional APL print wheels are made by Diablo and XEROX. Diablo has both a plastic APL print wheel (part number 38150-01) and a metal one (part number 311951-01). XEROX has a metal print wheel (part number 9R21135).

An APL function called SAMPLE can be listed on a serial printer attached to an IBM Personal Computer or to a SuperPET with the following commands:

    'SERIAL' □CREATE 4
    F←□CR 'SAMPLE'
    (□XR,(F,□AV[14])) □PUT 4
    □UNTIE 4

If the printer is attached via the IEEE-488 bus as with the Commodore 8300P, the filename used should be "ieee4". The statements above obtain the canonical representation of the function as an array of characters with each row of the array representing a line of the function. A carriage return character is appended to each line before writing to the printer.

On the IBM Personal Computer, an APL function can be listed on a 5152 printer having Waterloo's APL character set with the following commands:

    'PRINTER' □CREATE 2
    (□CR 'SAMPLE') □PUT 2
    □UNTIE 2

2. Printing from within a Program

In each of the following programs, the printer file is opened, a single line is printed, and the file is closed. Of course, any number of lines could be printed before closing the file. Since the filename "printer" is used in each, these programs will work as shown on a Commodore SuperPET equipped with a PET ASCII printer such as the CBM 4022, or on an IBM Personal Computer equipped with a parallel matrix printer. If a different printer is attached, the filename must be changed to properly reflect the device used.

The following Waterloo microBASIC program writes a line to the printer:

```
010 open #2,'printer',output
020 print #2,'Printed output'
030 close #2
```

The following program in Waterloo microCOBOL performs the same function as its BASIC counterpart:

```
identification division.
program-id.  SAMPLE.
environment division.
configuration section.
source-computer.  CBM-SUPERPET.
object-computer.  CBM-SUPERPET.
input-output section.
file-control.
    select printer-device
        assign to 'printer'.
data division.
file section.
fd  printer-device
    label records are standard.
01  display-record.
    02  filler     pic x(80).
working-storage section.
01  str pic x(80) value is
    'Printed output'.
procedure division.
    open output printer-device.
    write display-record
        from str.
    close printer-device.
    stop run.
```

In Waterloo microFORTRAN, printer output can be produced as follows:

```
open (unit=2,file="printer")
write(unit=2) "Printed output"
close (unit=2)
end
```

The Waterloo microPascal program equivalent is:

```
program sample( output );
var
    device : text;
begin
    rewrite( device,'printer' );
    writeln( device,
            'Printed output' );
end.
```

The variable "output" is initially associated with the screen, and is the default file variable used by "writeln". "output" can be reassigned to refer to the printer, as shown in the example below:

```
program sample( output );
begin
    rewrite( output,'printer' );
    writeln( 'Printed output' );
end.
```

In APL, the program becomes:

```
'PRINTER' □CREATE 4
'PRINTED OUTPUT' □PUT 4
□UNTIE 4
```

The program above does not depend upon the printer used being capable of printing APL characters, since it prints only alphanumeric values. If APL symbols are to be printed, a printer capable of handling them should be used and the appropriate file name, as described earlier, should be given. The external representation function (quad-XR) should be used whenever printing APL overstruck characters, with one exception. This is not necessary when using an IBM Personal Computer 5152 printer equipped with the Waterloo character generator.

WATSOFT Product List

WATSOFT Products Inc.   acts as a distributor for software products developed at the University of Waterloo and also for several WATCOM products.   Since an article describing WATSOFT appeared in infoWAT, we have received requests for a list of the products which WATSOFT distributes.   The following list shows products currently available from WATSOFT, and the systems on which the software operates.

Product	System
Waterloo Language Interpreters	IBM Personal Computer
Waterloo Language Interpreters	IBM /370 with VM/CMS
HOSTCM	VM/370 CMS, pdp11 RSTS/E, VAX/VMS
Terminal Emulation Package	Commodore SuperPET
Waterloo Systems Language (WSL)	IBM /370 with VM/CMS
Waterloo BASIC	IBM /370 with VM/CMS or MVS
Waterloo Pascal	IBM /370 computers
WATFIV	IBM /370 computers
WATBOL	IBM /370 computers
SCRIPT	IBM /370 computers
WATFOR-11S	DEC pdp11 computers
WATBOL-11	DEC pdp11 computers
WIDJET	DEC pdp11 computers, IBM Series/1
Waterloo BASIC	IBM Series/1
ASMG (Assembler G)	IBM /370 computers
LP1	IBM /370 computers
TRACE	IBM /370 computers
Waterloo Structured BASIC chip	Commodore PET

Information concerning the packages listed above can be obtained by contacting WATSOFT at the address below, by phoning (519)886-3700, or via TELEX at 06-955458.

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infoWAT Subscriptions

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