31KW Patched Version of MSU BASIC

MSU BASIC is a time-sharing system for a 16KW HP2116B (or compatible) minicomputer. Up to four users can be supported, each connected to a TTY interface card in addition to a TTY used for logging activity. Recently the system was slightly modified to permit operation using a single TTY interface by disabling the logging function, this system is on the MsuBasic wiki site linked at the end of this file.

This BASIC is similar to HP paper-tape BASIC: numerical input only, no strings, LET is required to assign variables, the last statement must be END, array subscripts are in brackets (if parenthesis are used they are changed to brackets), one or two subscripts starting at 1, and # means "not equal", if <> is used it is changed to #. All variables are floating point and has matrix operations. The "_" character removes the previous character from the input buffer to correct mistakes. Differences include no CALL (obviously), no WAIT, and the photo-reader TAPE command apparently is for hardware not supported by the HP2100 simulator (possibly requires a "redirect relay" to read from the TTY's paper-tape unit but just guessing. If the simulator's TTY2 device is attached to a file the PUNCH command writes binary code to the file in addition to listing the file to the console. Practically this is not an issue if the system can be modified to start up without clearing memory, permitting the entire memory to be saved listing and all. With suitable simulator settings or a terminal with character and line delay, BASIC code can be pasted to load programs into memory to begin with, and LIST output can be copied or captured to save programs in listing form that were entered on-line.

A 31KW version was desired because that's the biggest memory size that still leaves the top page free to contain software for saving the memory image. For this I use HP-IPL/OS, a non-vintage HP 21xx operating system written, well, because we had no operating system. HP-IPL/OS is a stacked-based threaded interpreter resembling FORTH where "words" are definitions of more primitive words that appear before it in the "dictionary", or all the words currently loaded. There is no distinction between a program and a subroutine, they're all words. "IPL" files contain sets of words that can be loaded into the dictionary to configure a "build" to perform what needs doing. On a HP21-MX-class machine the dms.ipl package maps the 32-63KW range of memory to be "alternate memory" (alt mem) and can install a "swapper" program that swaps main and alt mem and executes from location 2. This provides a way to execute arbitrary binaries up to 31KW in length. The standard extra.ipl package has a word that loads ABS files from PTR into alt mem. The altutil.ipl package provide words to examine and change alt mem, fcam.ipl has words that find code in alt mem and punch the ranges to an ABS file. Other IPL files provide disk drivers and words for copying alt mem to and from disk files.

To make a 31KW version I modified the "prepare" source file by adding 36000 octal to all code ORG statements. Didn't work... traced the problem to a subroutine within the interpreter that expected a byte pointer, only the prepare program was using BLS to multiply the word offset by two to obtain the pointer. That's a signed instruction so it won't work with addresses above 16KW, changed two BLS instructions to RLB, an unsigned rotate. With this change the prepare process completed and generated an apparently working binary, but not without worry... for some unexplained reason after entering the INFORMATION TABLE line(s) the first character of the STANDARD FREE and ACCEPT prompts are replaced by a digit, which varies depending on the length of the information lines. The exactness of the effect is suspicious, suspected an assembler bug but that's not the case - assembling the sources with the vintage extasmb assembler produces exactly the same effect and output binaries as the modified Asm21 perl assembler provided with the source files. Hopefully this is merely a cosmetic effect. No changes were made to the "monitor" source, the actual BASIC interpreter.

The 31KW-modified MSU BASIC system was able to run a paper-tape-modified version of STTR1 (TREKPT) essentially as-is, the only changes to the program were to shorten a few lines due to using LIST to save the listing thus making a few lines 73 characters long. The OTHPT Othello-playing program also ran as-is. These are both fairly intense programs and I was very pleased to see them run!

From this point on, modifications were made directly to the binary image rather than through source code changes. For one thing I wanted to leave the source as unchanged as possible so that it could be used to generate relatively stock multi-user versions of MSU BASIC if desired, but also because it's just easier. Directly patching the binary permits things like applying an updated set of patches, altering the device slots, changing the information string and other tasks, without having to repeat the prepare process or even disturbing a BASIC program in memory. This necessitates that the prepare and monitor binaries be essentially frozen except for patches which do not affect where things are in memory, thus the following information applies to the msuprep.abs file dated 3/1/08, and the msumon.abs file dated 2/28/08. These files along with the latest patches and configuration instructions are in the msubasic.zip file, from the 31KW MSU BASIC web page linked at the end of this file.

Essentially, to get MSU BASIC to boot straight to the READY prompt without clearing memory, it has to be run and logged onto so that the data structures are initialized. Only then can memory be patched to bypass the initialization code and other things then saved to a new binary that has the desired functionality. Using the monitor and prepare assembly listings and dumps of earlier patched versions I determined addresses of things that could be changed...

```
00003   Contains address to start execution at (stock=67115)
00100   Contains address to start running BASIC at (stock=2012)
02021   Running BASIC from here bypasses the program buffer reset
00101   Contains address of the log-off code (stock=73313)
67562   Contains address of the log-on code (stock=73073)
67314   Starting execution here bypasses the date/time prompts
73205   Putting this in 67562 bypasses the log-on prompts
73070   Contains the number of info lines in two's compliment form
73071   Contains the address of the info lines address table
73072   Contains the address of the info lines length table
72647   Contains the correction character when reading from paper-tape (137)
75530   Contains the correction character when reading from the console (137)
```

The CLK and TTY I/O instructions are scattered throughout the code...

```
CLK: 67340 67342 73547 75631 75643
TTY: 67314 67351 67457 67460 67461 67466 67467 67470 67472
     67316 67317 67332 67333 75612 75635 (NOPs in listings)
     73661 73665 73666 73671 73672 73673 74647
```

Locations 67316 and 67332 are initialized to access the log TTY slot, so long as a valid console they do no harm but make it necessary to specify a valid log TTY device even though logging is disabled.

Important: To permit changing the information lines, when preparing the "raw" MSU BASIC system to be patched these need to be space-padded to make sure there's enough memory allocated, otherwise the entire data structure has to be recalculated rather than just changing the text data and lengths.

A very simple patch that achieves the critical functionality of preserving memory would be simply change location 3 to 67314, 100 to 2021 and 67562 to 73205. But this does not run a CLC 0 instruction on startup (possibly causing bugs) and it would be nice to make BYE return to HP-IPL/OS.

The following patch set is from the 3/3/08 version of the MSUPATCH utility...

```
   67562  73205 APUT ;BYPASS LOG-ON PROMPTS
     100   2021 APUT ;BYBASS BASIC INIT
; PATCH TO MAKE BYE EXIT TO HP-IPL/OS OR LOGOUT...
   75700 163705 APUT ;LDA 75705,I  GET 1ST SWAPPER INSTRUCTION
   75701  53706 APUT ;CPA 75706    IS IT HP-IPL/OS?
   75702 127705 APUT ;JMP 75705,I  YES - RUN THE SWAPPER
   75703 127704 APUT ;JMP 75704,I  NO - RUN THE STOCK LOGOUT
   75704  73313 APUT ;73313 - ADDRESS OF LOGOUT CODE
   75705  77000 APUT ;LOCATION OF SWAPPER = 77000
   75706 105734 APUT ;1ST SWAPPER INSTRUCTION = 105734
     101  75700 APUT ;SET BYE VECTOR TO NEW CODE
; NEW STARTUP PATCH (WAS JUST 3=67314 BUT THAT DIDN'T CLC 0)
   75720 106700 APUT ;CLC 0
   75721 127722 APUT ;JMP 75722,I
   75722  67314 APUT ;67314 - START PAST TASK INIT
       3  75720 APUT ;SET START TO NEW STARTUP CODE
```

This patch adds code at 75700 that checks to see if it was run from HP-IPL/OS, if so it runs the swapper code to swap alt and main mem to exit. If running as a stand-alone ABS it executes the existing logout code which prints the usage time and a message then prompts to log on again. The original version of this patch simply halted but I discovered that if HELLO-ROOT given to log on again it goes back to the READY prompt with the program listing intact. The log-out vector at 101 is changed to run the new code when BYE is entered.

Location 75720 contains a CLC 0 and a jump to the 67314 entry point to make sure all devices are turned off when starting up, the main run vector in location 3 is changed to run this code. The present MSUPATCH utility also contains functions to change the console backspace to ascii-8 rather than the stock "_" character, alter the info line(s) (but not the number of lines), and alter the CLK and TTY device slot assignments.

Configuration and patching procedure...

The following is a recreated log illustrating the prepare and patch process which was used to create the msubasic.abs file in the 3/4/04 version of msubasic.zip, the initial prepare output is in msuraw.abs and was found to be identical to the version of the zip so the recreation was accurate. This log was created by "running" the prepare.sim script in the HP2100 simulator, the single information line was space-padded to column 79, which was read as 72 characters in length. After the prepare process, patch.sim was run to patch the msuraw.abs binary and create the msubasic.abs binary. The exact binary content of msubasic.abs and further derivatives will vary depending on how long left on, leftover edit buffers, etc.

```
--------- begin log -----------------
HP 2100 simulator V3.7-3
PTP: creating new file
: To create a stock-HP-IPL/OS-compatible version...
: Enter 10 for CLOCK I/O ADDRESS
: Enter 11 for LOG TTY I/O ADDRESS
: Enter 1 for NUMBER OF CHANNELS
: Enter 11 for CHANNEL 1 TTY I/O ADDRESS
: Enter NO for CARD READER and PHOTOREADER
: (both TTY addresses need to be the same)
: (use clk=10 tty=11 if patching, can be reconfigured)
: Enter 0 for ACCOUNT NUMBER
: Enter a log-on string for CODE WORD (like ROOT)
: Enter /E for next ACCOUNT NUMBER
: Enter one or more sign-on lines for INFORMATION TABLE
: (space-pad the lines to column 79 to permit changing)
: Enter /E when done entering info lines
: Enter YES for ACCEPT STANDARD CORE
```

```
: (1st char of prompts corrupted, don't know why...)
: Enter YES for PUNCH ABSOLUTE TAPE
: Enter 13 for PUNCH I/O ADDRESS

CLOCK I/O ADDRESS? 10

LOG TTY I/O ADDRESS?  11

NUMBER OF CHANNELS? 1

CHANNEL 1 TTY I/O ADDRESS? 11

CARD READER IN SYSTEM?
YES OR NO: NO

PHOTO READER IN SYSTEM?
YES OR NO: NO

ENTER CODE-WORD TABLE


ACCOUNT NUMBER? 0
CODE WORD? ROOT

ACCOUNT NUMBER? /E

ENTER INFORMATION TABLE

31KW MSU BASIC
/E
DECIMAL FREE CORE AVAILABLE:  24299
9TANDARD FREE CORE IS DECIMAL 24299

9CCEPT STANDARD CORE?
YES OR NO: YES

PUNCH ABSOLUTE TAPE?
YES OR NO: YES
SYSTEM PUNCH DEVICE I/O ADDRESS? 13
HALT instruction 102077, P: 61420 (LIA 1)
: Should have halted with 102077
: If setting up patched version enter: do patch.sim
: Otherwise exit sim.
sim> do patch.sim
PTP: creating new file
: To create a patched version of MSU BASIC...
: Enter RUNABS and press N for halt (msuraw.abs already attached)
: Specify date/time, as in 78, 11, 11, 1111 for each of the prompts
: Enter HELLO-ROOT (or whatever CODE string was) to log on
: Enter a short string for NAME-ID. (like NONE)
: At the READY prompt press control-E to halt the sim
: (if desired a basic program can be pasted/entered first)
: Enter run 77000 to return to the utility
: Enter MSUPATCH to run the patch utility
: Press 1 to apply patches
: Press 4 if clk/tty slots need reconfiguring
: When done running the patch utility press space to exit
: Enter AM2ABS and press Y when Save ABS prompt appears
: Press N for the halt prompt (msubasic.abs already attached)
: Press control-E to halt then exit sim

HP-IPL/OS UTIL 1.51B
? RUNABS
HALT FOR CABLE SWAP? N
LOADING....................................


YEAR? 78
MONTH? 11
DAY? 11
TIME? 1111
HELLO-ROOT
```

```
NAME-I.D.ROOT
CHAN: 1 ACCOUNT 0
TIME ON:  1111  11/ 11/ 78
31KW MSU BASIC

READY

Simulation stopped, P: 74071 (ISZ 75067)
sim> run 77000

HP-IPL/OS UTIL 1.51B
? MSUPATCH
SINGLE USER 31KW MSU BASIC PATCH UTILITY
[1] APPLY PATCHES
[2] CHANGE BACKSPACE
[3] CHANGE INFO LINES
[4] CONFIGURE SLOTS
PRESS KEY OR ANY OTHER TO EXIT: 1
APPLYING PATCHES...
[1] APPLY PATCHES
[2] CHANGE BACKSPACE
[3] CHANGE INFO LINES
[4] CONFIGURE SLOTS
PRESS KEY OR ANY OTHER TO EXIT:

? AM2ABS

SCANNING ALT MEM...
DETECTED EXTENTS:
FROM 000002 TO 013547
FROM 067100 TO 067677
FROM 072500 TO 075777
SAVE AS ABS? Y
HALT FOR ATTACHING/DETACHING FILES? N
SAVING...
DONE.
?
Simulation stopped, P: 02226 (JMP 2225)
sim> exit
--------- end log -------------------
```

The msubasic.abs file now contains a patched empty 31KW MSU BASIC binary which can be run directly, repatched for different slots, run from HP-IPL/OS using RUNABS to paste in a BASIC program then saved to a stand-alone binary which preserves the program using AM2ABS, or imported into a HP-IPL/OS disk system by attaching to PTR and using the command "MSU BASIC" ABS2F (precede the filename with @ if using the DMENU disk menu program to list it on the menu). With disk systems the binary can be run, a BASIC program pasted or entered, BYE then "PROGNAME" 174000 AM2F used to save as a new binary containing the program. The save process can be automated by making a new word which prompts for a filename and to overwrite if the file exists.

For stand-alone use, a program could be written to occupy memory above 76000 and run to punch an ABS file to PTP or another save method without requiring a separate OS, then manually operated or added to the BYE patch code beginning at 75700. A tricky aspect of doing this is saving only what needs to be saved to avoid creating large binaries for small programs, likely by accessing pointers in zero page which define the size of the program buffer.

Reference dump of a patched 31KW MSU BASIC binary...

To create the following reference dump I loaded up MSU BASIC and entered a short program, entered BYE and saved it to a new file, which was listed and run, then the SHAM (show alt mem) utility was used to dump it in octal and ascii form.

```
------- Begin session recorded 3/4/08 --------------------------------

HP 2100 simulator V3.7-3

[boot text removed]

? "HPOSTEST 1.51" XLOAD
Loading system binary...

HP-IPL/OS 1.51 TEST
? "SQREXAMPLE" XLOAD
Loading system binary...
31KW MSU BASIC

READY
LIST
100  LET A1=1
110  LET A2=2
120  LET A3=SQR(A1+A2)
130  PRINT "SQUARE ROOT OF"A1"+"A2"="A3
140  END

READY
RUN
SQUARE ROOT OF 1    + 2    = 1.73205

READY
BYE

HP-IPL/OS 1.51 TEST
? SHAM

ADR: ALL
00000:000000 062001 124003 075720 114040 102005 000000 000000 ..d...{.. ......
00010:114030 114031 000000 000000 000000 000000 000000 000000 ................
00020:000000 000000 000000 000000 000000 000000 000000 000000 ................
00030:073477 074476 074533 074570 074625 074716 072544 072077 w?y>y[yxy.y.udt?
00040:075565 000000 000000 000000 000000 000000 000000 000000 {u..............
00050:000000 000000 000000 072000 072011 002012 072033 072054 ......t.t...t.t,
00060:072062 002147 072535 000001 000111 000000 000000 000000 t2.gu]...I......
00070:000000 013203 013333 013463 013613 000000 000000 000000 .......3........
00100:002021 075700 073023 074000 074365 075021 075032 006055 ..{.v.x.x.z.z..-
00110:002163 074456 074423 074442 013450 072550 072712 072712 .sy.y.y".(uhu.u.
00120:072551 013450 013525 000040 000214 165627 177777 000000 ui.(.U. ........
00130:000000 013525 072701 072551 013554 013525 013554 072701 ...Uu.ui.l.U.lu.
00140:013525 166002 000000 177777 013450 177777 000456 000040 .U.......(.....
00150:000000 000000 000001 000001 000000 013525 006505 006563 ...........U.E.s
00160:000001 010105 000000 166002 001721 000000 000000 000000 ...E............
00170:006514 007333 067331 000000 165641 000000 002543 000000 .L..n........c..
00200:005037 000000 177766 007345 000001 013524 100000 000376 ...........T....
00210:045000 165625 177775 177775 000000 177767 072703 177777 J...........u...
00220:000000 000000 000002 000000 000000 000000 000000 067331 ..............n.
00230:114631 166000 116000 006101 070661 156000 000000 000000 .......Aq.......
00240:000205 000242 051105 040504 054415 000456 000251 003657 ....READY.......
00250:002140 037421 005146 006016 002032 002021 002113 004470 .`?..f.......K.8
00260:004006 011445 004121 004411 000642 000672 004247 001711 ...%.Q..........
00270:010014 004231 004713 004753 001753 001773 001662 001636 ................
00300:001651 007625 006075 005552 011053 011162 007340 007346 .....=.j.+.r....
00310:007417 007466 001471 001317 001524 001077 011417 001432 ...6.9...T.?....
00320:006425 004306 004345 004335 006141 012053 006054 003250 .........a.+.,..
00330:005557 005622 005627 005636 005724 014544 014544 001573 .o.........d.d.{
00340:002345 003332 006752 007705 000100 002242 102766 105737 .........@......
00350:106650 011771 003656 003712 003765 004023 004041 004102 ..............!.B
00360:003741 003762 004010 004013 004015 004020 004036 000217 ................
00370:000001 000002 000003 000004 000006 000007 000010 000011 ................
00400:000012 000014 000017 000027 000032 000033 000034 000036 ................
00410:000037 000040 000041 000042 000043 000044 000045 000050 ... .!.".#.$.%.(
00420:000051 000053 000055 000056 000057 000060 000061 000072 .).+.-.../.0.1.:
00430:000077 000100 000105 000106 000110 000112 000113 000116 .?.@.E.F.H.J.K.N
00440:000122 000123 000133 000177 000200 000377 000400 000776 .R.S.[.........
00450:000777 001000 002000 003000 003002 004000 005000 014000 ................
00460:021000 022000 023000 035000 036000 052000 063146 077000 ".$.&.:.<.T.ff~.
00470:077600 077777 100017 100037 100777 140000 174000 177777 ..............
```

```
00500:177776 177775 177774 177773 177772 177771 177770 177767 ................
00510:177766 177765 177761 177760 177755 177753 177747 177740 ................
00520:177725 177706 177700 177670 177667 177664 177645 177400 ................
00530:177312 176030 154360 043116 040000 000000 100000 000376 ......FN@.......
00540:102756 002050 114631 116373 002543 060544 070176 060126 ...(.....cadp~`V
00550:070173 060125 070174 002400 114104 070130 070126 114112 p{`Up|...DpXpV.J
00560:064414 044116 074125 060432 015773 060440 015773 015773 i.HNxUa...a ....
00570:060123 015773 064176 060343 002004 154000 003005 024574 `S..h~`.......)|
00600:040343 070175 003004 114272 060427 015773 060124 114272 @.p}....a...`T..
00610:060126 064415 044116 114112 060175 040344 002021 124254 `Vi.HN.J`}@.....
00620:002404 114104 060173 064174 070126 074125 124176 000000 ...D`{h|pVxU.~..
00630:064210 054211 124627 003400 040212 070212 044477 160001 h.X.....@.p.I?..
00640:170212 024631 000000 064642 074161 015662 124161 006400 ..)...i.xq...q..
00650:074147 006004 050421 024657 050422 007401 024662 074147 xg..Q.).Q...).xg
00660:015662 024670 014672 024666 034161 124161 054147 003401 ..)...).8q.qXg..
00670:014544 124161 003221 064672 074162 006400 074150 074234 .d.q..i.xr..xhx.
00700:074235 074236 074211 007400 074237 050423 034237 024713 x.x.x...x.Q.8.).
00710:002400 070236 024732 015636 024765 034236 001727 001723 ..p.)...).8.....
00720:070212 015230 064150 006002 024736 060373 070150 060212 p...hh..).`.ph`.
00730:006400 015174 034211 015662 025034 024705 044502 007000 ...|8...*.).IB..
00740:060212 074212 006400 034212 024762 000040 044235 103101 `.x...8.).. H..A
00750:002040 002004 040234 102301 024731 000065 005500 034150 . ...@....).5.@8h
00760:000000 024731 000065 005500 024743 006400 074212 054211 ..)...5.@)...x.X.
00770:124162 050432 002001 025034 015662 014544 050421 025004 .rQ...*....dQ.*.
01000:050422 003401 025006 070212 015662 024775 015636 024775 Q...*.p...)...).
01010:070211 015662 025030 015636 025030 064211 005020 044211 p...*...*.h...H.
01020:005000 040001 070211 015662 025030 015636 002001 024775 ..@.p...*.....).
01030:060211 034212 003004 002001 002400 034237 040236 002003 `.8.......8.@...
01040:025055 002020 025051 003004 070236 015261 034236 025045 *-..*)..p...8.*%
01050:025055 070236 015230 034236 025052 060234 064235 034147 *-p...8.**`.h.8g
01060:025064 003000 007007 002004 015077 034133 170133 034133 *4.......?8[.[8[
01070:174133 034133 015701 015662 060400 034162 124162 007333 .[8[....a.8r.r..
01100:015174 002103 125077 044443 002021 006004 103101 002040 .|.C.?I#.....A.
01110:002104 102301 001200 002031 025117 002300 001130 001300 .D......*O...X..
01120:071230 060001 010527 070001 061077 070171 060150 002040 r.`..Wp.b?py`h.
01130:040477 102201 002004 040444 002020 025154 040527 002021 A?....A$..*lAW..
01140:025160 040444 001200 010445 044000 061230 050536 002001 *pA$...%H.b.Q^..
01150:124171 054537 025160 124171 014544 002400 006400 124171 .yY_*p.y.d.....y
01160:014544 061230 015164 124171 000000 064500 002020 064447 .db..t.y..i@..i'
01170:030471 002020 060536 125164 010347 071230 002040 071317 19..a^.t...r...r.
01200:061230 002003 006002 025211 070150 070234 074235 125174 b.....*.php.x..|
01210:035317 004066 001600 002061 025210 002060 025210 001500 :..6...1*..0*..@
01220:005540 070234 061317 003004 040150 070150 060234 025206 .`p.b...@hph`.*.
01230:070661 060234 002003 125230 064150 044372 074150 064235 q.`.....hhH.xhh.
01240:000065 005500 000065 005540 044235 002040 002004 040234 .5.@.5.`H.. .@.
01250:002021 025256 000065 005500 034150 000000 070234 074235 ..*..5.@8h..p.x.
01260:125230 010153 060234 002003 125261 064500 044150 074150 ...k`.....i@Hxh
01270:060235 000065 015317 000466 000066 005640 040001 002040 `..5...6.6..@..
01300:006004 074235 060234 015317 000466 000040 040001 040235 ..x.`....6. @.@.
01310:002040 006004 074234 070001 060234 015174 125261 000000 . ..x.p.`..|....
01320:064500 075230 165317 164001 002120 003204 006020 007204 i@z......P.....
01330:002040 035230 075174 064513 074627 006400 001600 001550 . .:z|iKy......h
01340:045174 005500 034627 025337 001540 035230 025352 007000 J|.@9.*..`:.*...
01350:003007 006004 103101 035317 125317 002537 074213 001727 .....A:...._x...
01360:030411 165355 035355 044371 150001 025373 034213 025363 1...:.H...*.8.*.
01370:001727 010443 125355 003400 040001 160000 010467 170133 ...#....@....7.[
01400:050457 124327 035355 125355 000000 070001 010445 071524 Q/..:....p..%sT
01410:060001 001727 010445 001000 015317 001524 002020 014544 `....%.....T...d
01420:125404 000000 015432 124342 002041 044477 002003 006020 .........!I?....
01430:124342 125421 000040 102101 070172 015524 002020 025462 ..... .Apz.T..+2
01440:040513 002020 103101 040506 002021 125432 040506 071524 AK...AAF....AFsT
01450:060172 025456 000071 002200 004035 102101 035524 025452 `z+..9.....A;T+*
01460:035432 125432 060172 002120 003401 002401 007401 006400 ;...`z.P........
01470:025460 000000 070157 060001 064157 007100 020527 040446 +0..po`.ho.@!WA&
01500:002041 025520 006004 054536 025510 054475 002001 025520 .!+P..Y^+HY=..+P
01510:044475 000033 030470 006021 002005 040477 001200 010445 I=..18....A?...%
01520:070157 060001 064157 125471 010123 060001 010445 007000 po`.ho.9.S`..%..
01530:044000 007000 000033 030470 125524 005557 034136 060136 H.....18.T.o8^^
01540:050137 014544 174136 125535 005566 007400 044137 074137 P_.d.^.].v..H_x_
01550:054136 025541 125544 005760 015563 015604 164137 160001 X^+a.d...s..._..
01560:006004 164001 125553 006102 164137 160001 050536 006005 .....k.B._..Q^..
01570:025575 160001 050537 014544 044477 054135 002001 125563 +}..Q_.dI?X]...s
01600:060135 040500 070135 125563 001556 060135 040371 070135 `]A@p].s.n`]@.p]
```

```
01610:040477 050134 002001 125604 060134 002004 070211 040377 A?P\....`\..p.@.
01620:070134 060136 002004 070210 040377 070136 002004 070212 p\`^..p.@.p^..p.
01630:003004 040137 002020 025541 014627 125604 003522 064000 ..@_..+a.....Rh.
01640:044521 006021 125636 044400 006020 125636 035636 060001 IQ....I.....;.`.
01650:125636 002125 064000 044526 006021 125651 044404 006021 ...Uh.IV....I...
01660:035651 125651 004146 034126 002001 125662 064125 034125 ;....f8V....hU8U
01670:004065 160001 002041 001727 010443 050123 025663 035662 .5...!...#PS+.;.
01700:125662 166002 003400 040126 070126 003400 040125 070125 ......@VpV..@UpU
01710:125701 006514 075701 065711 074170 065701 002300 114270 ...L{.k.xxk.....
01720:015753 060411 015773 064220 044126 006002 025721 124170 ..a...h.HV..+..x
01730:000000 065730 074155 064126 006003 124155 044512 006021 ..k.xmhV...mIJ..
01740:025734 074157 060411 015773 034157 025742 064126 044525 +.xoa...8o+.hVIU
01750:006021 015753 124155 006563 061753 070157 060142 000010 .....m.sc.po`b..
01760:002004 040126 064116 114112 064220 044126 074220 002400 ..@VhN.Jh.HVx...
01770:070142 114320 124157 001723 071432 034126 064126 004010 pb...o...s.8VhV..
02000:034125 160125 004010 001727 010527 031432 004010 001727 8U.U.....W3.....
02010:170125 125773 060114 070121 070122 060411 070123 002400 .U..`LpQpRa.pS..
02020:070124 002400 114104 070167 070127 070130 114112 060504 pT...DpwpWpX.JaD
02030:064241 114112 060127 002020 026147 064245 074146 060130 h..J`W..,gh.xf`X
02040:002003 026047 124103 114111 002002 026060 026021 060500 ..,'.C.I..,0,.a@
02050:064146 114112 114106 060434 064116 114113 050500 026107 hf.J.Fa.hN.KQ@,G
02060:003021 014544 070126 060116 000066 070125 015662 026035 ...dpV`N.6pU..,.
02070:064167 006003 026120 050441 016163 002400 114112 015701 hw..,PQ!.s...J..
02100:114105 064167 002400 070167 124001 056040 002105 066106 .Ehw..pw..\ .ElF
02110:002404 114112 026052 000000 066113 074167 064246 026036 ...J,*..lKxwh.,.
02120:064120 074133 170133 015651 026205 002400 070130 114112 hPx[.[..,...pX.J
02130:060352 064507 114262 014544 001727 001100 040250 124000 `.iG...d...@@...
02140:114105 124252 026012 006400 074175 114105 124257 060127 .E..,...x}.E..`W
02150:001500 060434 064116 002040 114062 114060 050501 026021 .@a.hN. .2.0QA,.
02160:002003 026147 026060 000000 114106 002400 114104 114112 ..,g,0...F...D.J
02170:060373 064247 114112 026021 006400 074127 070130 114106 `.h..J,...xWpX.F
02200:026043 124101 124102 126204 005037 114266 000532 034133 ,#.A.B.......Z8[
02210:074124 064120 006004 074206 050400 124323 170133 060353 xThP..x.Q....[`.
02220:064514 114262 014544 064507 076315 064122 054121 002001 iL...diG|.hRXQ..
02230:026234 064114 074121 074122 074205 006400 076317 076321 ,.hLxQxRx...|.|.
02240:001727 001300 040346 124000 001000 021040 002000 026040 ....@....." ..,
02250:003000 035440 004001 024440 005001 056440 006002 026040 ..; ..) ..] ..,
02260:007002 036440 010007 025440 011007 026440 012010 025040 ..= ..+ ..- ..*
02270:013010 027440 014012 057040 015005 037040 016005 036040 ../ ..^ ..> ..<
02300:017005 021440 020005 036440 021011 026440 022020 055440 ..#  .= ".- $.[
02310:023020 024040 024011 025440 025003 177767 026004 000000 &.( (.+ *...,..
02320:027011 000000 030005 177777 031005 077461 060506 072315 ....0...2.1aFt.
02330:017045 057461 014544 050400 124322 024336 036317 017461 .%_1.dQ...(.<..1
02340:124322 026337 064122 054114 002001 014544 074214 036317 ..,.hRXL...dx.<.
02350:003400 072321 017461 002001 026350 064214 074121 074122 ..t..1..,.h.xQxR
02360:124322 017566 026372 060207 001727 030210 050533 002001 ...v,.`...0.Q[..
02370:026372 017566 014544 060207 064427 017601 060210 017612 ,..v.d`.i...`...
02400:030536 170133 017507 000000 014544 017622 007400 015355 1^.[.G...d......
02410:002257 014544 060500 040133 160000 010450 072321 017045 ...da@@[...(t..%
02420:026333 060400 114321 124322 017045 170133 060362 007400 ,.a......%.[`...
02430:114262 014544 114271 000532 026333 017507 000000 014544 ...d...Z,..G...d
02440:007400 015355 002257 026411 017045 170133 060363 007400 ......-..%.[`...
02450:114262 014544 017045 050400 124322 007400 044133 074133 ...d.%Q.....H[x[
02460:170133 060364 007400 114262 014544 017045 026333 017507 .[`......d.%,..G
02470:000000 026437 026333 034133 015662 124322 024336 014642 ..-.,.8[....(...
02500:024670 017645 007400 015355 002245 026333 026477 017507 )..........,.-?.G
02510:014544 000000 007400 015355 002245 002001 026507 006400 .d..........-G..
02520:174133 034133 026333 064500 015355 002245 026534 003400 .[8[,.i@....-\..
02530:170206 034133 015662 124322 007400 015355 002243 026553 ..8[..........-k
02540:060413 114321 014544 062244 170133 034133 015662 124322 a....dd..[8[....
02550:007400 174206 026523 134206 014544 170133 060366 007400 ....-S...d.[`...
02560:114262 002401 060473 007400 044133 074133 002003 026577 ....a;..H[x[..-
02570:130133 170133 017635 006400 174133 034133 026601 015701 .[.[.....[8[-...
02600:017045 050400 124322 026523 017566 014544 015651 026652 .%Q...-S.v.d..-.
02610:034133 064207 005727 030001 170133 060354 064500 114262 8[h...0..[`.i@..
02620:014544 050465 026640 017475 050400 124322 064500 015355 .dQ5-..=Q...i@..
02630:002245 014544 015662 026636 015701 026623 034133 124322 ...d..-...-.8[..
02640:017475 117017 000000 050400 124322 007400 015355 002245 .=....Q.........
02650:026631 026640 070210 060133 070226 060207 064423 017601 -.-.p.`[p.`.i...
02660:060210 007400 015355 002257 026411 160226 010450 170206 `.......-....(..
02670:017566 026740 015651 026754 034133 064207 005727 030001 .v-...-.8[h...0.
02700:170133 060357 064503 114262 014544 001727 001723 040402 .[`.iC...d....A.
02710:007400 044133 130001 030536 170001 010450 040527 002021 ..H[..1^...(AW..
```

```
02720:026726 015662 124322 117017 014544 024336 015662 024335  -........d(...(.
02730:017612 017475 017622 160226 010450 150206 014544 124322  ...=......(...d..
02740:034133 017612 017045 017622 007400 015355 002265 014544  8[...%.........d
02750:017475 050400 124322 024336 070210 060133 070226 060207  .=Q...(.p.`[p.`.
02760:064423 017601 060210 050400 124322 064501 015355 002261  i...`.Q...iA....
02770:014544 006400 040376 052266 027011 076321 017475 050400  .d..@.T...|..=Q.
03000:002001 024336 036321 124322 160226 010450 150206 014544  ..(.<......(...d
03010:124322 160226 010450 007400 150206 027007 026775 013150  .....(......-..h
03020:002325 002336 002342 002361 002421 002432 002424 002435  ................
03030:002467 002432 002473 002473 002473 002473 002473 002477  .7...;.;.;.;.;.?
03040:002507 002527 002507 002473 002604 002601 002400 170205  .G.W.G.;........
03050:003400 072323 017507 027212 027160 015651 027160 064500  ..t...G...p...pi@
03060:017253 060207 001727 030210 050533 027113 170133 060356  ..`...0.Q[.K.[`.
03070:064511 114262 027077 001727 001723 030536 027121 036323  iI..`..?....1^.Q<.
03100:027203 060365 007400 114262 027203 007400 044133 160001  ..`.........H[..
03110:010467 170001 027250 015662 026372 015651 026372 040522  .7......,....,.AR
03120:001700 040402 070207 007400 044133 160001 010467 030207  ..A.p...H[...70.
03130:170001 015662 014544 017612 017304 017045 017261 017622  .....d......%....
03140:027223 064500 015355 002251 027204 060455 170133 060420  ..i@......a-.[a.
03150:007400 144205 006020 027204 174205 034133 015662 060400  ..........8[..a.
03160:050400 027204 072323 064503 017253 160133 001727 010443  Q...t.iC...[...#
03170:066315 015355 002261 002001 027232 007400 015355 002257  l.............
03200:027141 073461 027050 060210 164205 006002 014544 174133  .aw1.(`.....d.[
03210:034133 127045 050417 027226 050442 027226 006400 074147  8[.%Q...Q"....xg
03220:014672 027235 017645 064507 076315 027160 034133 060462  ......iG|..p8[a2
03230:170133 134205 064507 076315 027050 036323 014544 064460  .[..iG|..(<..di0
03240:050421 027245 050422 027246 027236 044453 034133 174133  Q...Q.....I+8[.[
03250:064507 076315 027052 003165 170133 060355 114262 127253  iG|..*.u.[`.....
03260:027232 003137 070207 064205 044503 074205 006004 160001  ..._p.h.ICx.....
03270:072315 006004 160001 072323 006004 160001 073045 006004  t.....t.....v%..
03300:160001 073507 060207 127261 003135 064205 006004 062315  ..wG`....]h...d.
03310:170001 006004 062323 170001 006004 063045 170001 063507  ....d.....f%..gG
03320:017322 127304 003321 006004 170001 006004 074205 007004  ............x...
03330:044115 006020 014544 127322 000000 064500 015355 002305  HM...d....i@....
03340:127334 037334 160226 010513 002004 170226 060461 170133  ..>....K....a1.[
03350:006400 056317 027424 114271 000527 005727 074207 007400  ..\./....W..x...
03360:015355 002255 027367 134226 114271 000527 002001 006404  ...........W....
03370:036321 027401 070210 060001 030207 015404 040214 070214  <./.p.`.0...@.p.
03400:060210 064500 015355 002251 027206 060456 170133 034133  `.i@......a..[8[
03410:015662 060400 066317 006002 127334 017261 064500 044205  ..a.l.......i@H.
03420:074205 006004 164001 124001 063334 064205 017322 017304  x.......f.h.....
03430:064507 076315 060226 064205 017322 017045 007400 044133  iG|.`.h....%..H[
03440:074133 064500 044205 074205 006004 164001 074226 007400  x[i@H.x.....x...
03450:015355 002255 027401 134226 017045 007400 044133 074133  ..../....%..H[x[
03460:027401 007000 017475 017334 014544 050400 127461 007400  /....=...dQ..1..
03470:015355 002245 024336 037461 127461 000000 017566 014544  ....(.?1.1...v.d
03500:060133 070226 060207 064423 017601 060210 127461 003055  `[p.`.i...`..=.-
03510:017566 127507 037507 050417 027555 050442 027555 037507  .v.G?GQ./mQ"/m?G
03520:015636 027531 060207 044425 074207 017601 015662 060400  ../Y`.I.x.....a.
03530:027535 060207 064424 017601 060210 070210 006400 056321  /]`.i...`.p...\.
03540:127507 007400 044133 160001 010450 052321 027551 060210  .G..H[...(T./i`.
03550:127507 160001 030536 170001 027547 060133 070226 060207  .G..1^../g`[p.`.
03560:064423 017601 060442 017334 000000 127507 003512 015662  i...a".....G.J..
03570:060400 015651 127566 037566 070207 015662 060400 070210  a....v?vp...a.p.
03600:127566 003526 040522 044520 001700 030001 130133 170133  .v.VARIP..0..[.[
03610:034133 127601 003134 064500 015355 002305 027132 060462  8[...\i@.....Za2
03620:170133 127612 003140 064500 015355 002251 027206 060455  .[...`i@......a-
03630:170133 034133 015662 060400 127622 000000 015662 024335  .[8[..a.......(.
03640:034133 017612 017045 017622 127635 003223 070212 064501  8[...%......p.iA
03650:044133 160001 030536 170001 060212 127645 023004 051524  H[..1^..`...&.ST
03660:047520 000003 051125 047040 002003 051503 051040 004005  OP..RUN ..SCR ..
03670:050125 047103 044040 003004 046111 051524 034004 052101  PUNCH ..LIST8.TA
03700:050105 041003 041131 042440 042004 046505 051507 043003  PEB.BYE D.MESGF.
03710:051105 047040 032004 046105 052040 033040 042111 046440  REN 4.LET 6.DIM
03720:034003 041517 046440 035003 042105 043040 036003 051105  8.COM :.DEF <.RE
03730:046440 037004 043517 052117 040002 044506 041003 043117  M >.GOTO@.IFB.FO
03740:051040 042004 047105 054124 043005 043517 051525 041040  R D.NEXTF.GOSUB
03750:044006 051105 052125 051116 045003 042516 042040 046004  H.RETURNJ.END L.
03760:051524 047520 051004 042101 052101 052004 051105 040504  STOPR.DATAT.READ
03770:053005 050122 044516 052040 054005 044516 050125 052040  V.PRINT X.INPUT
04000:055007 051105 051524 047522 042440 056003 046501 052040  Z.RESTORE \.MAT
04010:057004 052110 042516 060002 052117 061004 051524 042520  ^.THEN`.TOb.STEP
04020:027003 047117 052040 026003 040516 042040 025002 047522  ..NOT ,.AND *.OR
```

```
04030:030002 037075 031002 036075 017002 036076 001003 052101 0.>=2.<=..<>..TA
04040:041040 002003 051511 047040 003003 041517 051440 004003 B ..SIN ..COS ..
04050:052101 047040 005003 040524 047040 006003 042530 050040 TAN ..ATN ..EXP
04060:007003 046117 043440 010003 040502 051440 011003 051521 ..LOG ..ABS ..SQ
04070:051040 012003 044516 052040 013003 051116 042040 014003 R ..INT ..RND ..
04100:051507 047040 015003 055105 051040 016003 041517 047040 SGN ..ZER ..CON
04110:017003 044504 047040 020003 044516 053040 021003 052122 ..IDN .INV ".TR
04120:047040 002134 072231 074215 060125 070211 060126 070212 N .\t.x.`Up.`Vp.
04130:060133 072247 002404 072454 160133 010443 150133 002001 `[t...u,.[.#.[..
04140:026163 001727 030411 170133 015662 026224 066454 054375 ,s..1..[...,m,X.
04150:026224 004010 026160 036247 001727 030411 172247 026163 ,...,p<...1..,s
04160:040517 142247 172247 036454 064215 074213 062231 072411 AO....=,h.x.d.u.
04170:162411 010375 052454 026202 040372 001100 042411 034213 ....U,,.@..@E.8.
04200:026167 026144 066411 076435 064133 026211 056247 026217 ,w,dm.}.h[,.\.,.
04210:006004 036435 162435 150001 026206 062454 026174 162411 ..=......,.e,,|..
04220:010467 170133 036121 126121 060211 070125 060212 070126 .7.[<Q.Q`.pU`.pV
04230:126121 003656 160133 030536 040372 170133 162231 072244 .Q...[1^@..[..t.
04240:034133 015662 014544 016247 000000 036231 126231 072552 8[...d....<...uj
04250:006400 076454 015636 026271 103101 066454 044001 044001 ..}...,..Am,H.H.
04260:046454 044001 044000 102201 026242 076454 015662 060400 M,H.H...,.},..a.
04270:026252 066454 006003 026242 174133 166247 164001 046454 ,.m,..,..[....M,
04300:006021 026242 066454 034133 036247 126247 002543 070210 ..,.m,8[<....cp.
04310:060400 070123 015662 026331 050210 026330 130133 170133 a.pS..,.P.,..[.[
04320:015662 026331 050210 026330 034133 001727 170133 026312 ..,.P.,.8[...[,.
04330:036306 034133 060411 070123 126306 160120 016411 124254 <.8[a.pS...P....
04340:124254 002400 006004 016435 124254 060120 003004 040133 ..........`P..@[
04350:170206 160120 016411 026370 026405 006004 160001 003004 ...P..,.-.....
04360:140206 002003 026372 002021 026406 160206 016435 026372 ....,...-.....,.
04370:160206 016454 006400 060120 070210 160210 170211 034210 ...,..`Pp.....8.
04400:034211 006004 154206 124254 026375 160206 016454 014627 8......,....,..
04410:026372 003701 070211 064121 054122 026433 160001 003004 ,...p.hQXR-.....
04420:040211 002003 026431 002020 026432 060001 002004 144000 @...-....-.`.....
04430:026414 036411 036411 074211 126411 003703 040211 070212 -.=.=.x.....@.p.
04440:164001 044211 054122 026451 160001 170212 034212 006004 ..H.XR-)....8...
04450:026442 060212 070122 126435 000003 064122 074210 044000 -"`.pR....hRx.H.
04460:074212 007004 044115 006020 124341 064212 074122 126454 x...HM....h.xR.,
04470:064121 074205 015662 026505 064116 074133 114266 000532 hQx...-EhNx[...Z
04500:160116 016411 124255 000000 074205 006400 054175 026512 .N......x...X}-J
04510:060442 114112 064205 054122 026701 003400 040120 070125 a".Jh.XR-...@PpU
04520:002400 070126 160205 016713 060123 015773 034205 160205 ..pV....`S..8...
04530:003004 002004 070160 034205 034160 026542 064120 060126 ....pp8.8p-bhP`V
04540:114112 026512 160205 010467 002003 026566 070210 001727 .J-J...7..-vp...
04550:001100 064000 040515 002021 026670 005000 006004 044345 .@h.AM..-.....H.
04560:160001 001727 010445 050413 026707 015773 160205 010474 .....%Q.-......<
04570:070211 010472 070172 002020 026630 002003 026533 050402 p..:pz..-...-[Q.
04600:026623 040503 002020 026606 003400 070172 060211 001727 -.AC..-...pz`...
04610:001700 010443 040431 015773 034172 026533 060211 010402 ...#A...8z-[`...
04620:040421 015773 026533 060433 015773 060437 015773 026606 A...-[a...a...-.
04630:020536 002102 026647 034205 070147 160205 034205 164205 !^.B-.8.pg..8...
04640:034160 034160 002020 002300 114270 000000 026533 050372 8p8p........-[P.
04650:026663 050402 002001 026601 060211 001722 010467 070210 -.Q...-.`....7p.
04660:064366 016777 026533 034205 034160 160205 016713 026533 h...-[8.8p....-[
04670:060123 015773 064353 016777 060464 050210 026756 060123 `S..h...a4P.-.`S
04700:026565 006400 054175 124255 060442 114112 124255 015773 -u..X}..a".J....
04710:016753 060413 026565 010066 064502 074177 067032 074200 ..a.-u.6iBxn.x.
04720:006400 074201 164200 007004 074202 007400 006004 040202 ..x.....x.....@.
04730:002021 026726 140200 072777 060001 002002 026741 050201 ..-....u.`...-.P.
04740:026744 040425 070201 015773 062777 034200 034177 026722 -.A.p...e.8.8-.
04750:040425 015773 126713 006543 062753 070162 160205 010443 A......ce.pr...#
04760:002002 015773 034205 034160 002001 026536 160205 001727 ....8.8p..-^....
04770:010443 050371 124162 050372 124162 015773 026756 000002 .#P..rP..r..-...
05000:160001 010467 050210 027012 160001 010375 040372 001100 ...7P.......@..@
05010:044000 027000 160001 010375 003004 070163 006104 074211 H.........ps.Dx.
05020:160001 002041 001727 010443 015773 002240 034211 034163 ...!...#....8.8s
05030:027020 126777 005033 023420 001750 000144 000012 063141 ......'....d..fa
05040:073075 063142 073123 063143 073126 064400 074206 064121 v=fbvSfcvVi.x.hQ
05050:074212 027060 064212 044210 074212 060206 040400 070206 x..0h.H.x.`.A.p.
05060:054122 027132 160001 070207 006004 160001 070210 060206 XR.Z..p.....p.`.
05070:050207 027052 170212 064121 054122 027052 006004 074211 P..*..hQXR.*..x.
05100:006004 160001 010467 001727 001300 050410 027117 050411 .....7....Q..OQ.
05110:027117 050414 027117 007400 044211 144211 027074 064500 .OQ..O..H....<i@
05120:044211 144211 160001 050207 002001 027113 060206 003004 H.....P....K`...
05130:170001 027113 063144 073075 063145 073123 002400 073126 ...Kfdv=fevS..vV
```

```
05140:027073 027052 050207 060206 124255 002020 060122 050121 .;.*P.`.....`RPQ
05150:124255 070131 060114 070216 060117 070132 060121 070155 ..pY`Lp.`OpZ`Qpm
05160:164155 074124 064155 034155 144155 074156 034155 160155 .mxThm8m.mxn8m.m
05170:001100 001727 010430 070142 050423 027205 050407 074155 .@....pbQ...Q.xm
05200:050421 074155 003400 070217 027221 060155 002004 160000 Q.xm..p..`m....
05210:027170 010450 064155 002003 044371 050372 006004 074155 .x.(hm..H.P...xm
05220:034155 060155 050156 027301 160155 002020 027211 010450 8m`mPn..m.....(
05230:002003 027220 070205 010402 050402 027310 040502 002020 ....p...Q...AB..
05240:027327 060205 114301 006021 027253 060536 064537 070206 ..`.......a^i_p.
05250:074207 060501 017510 064142 060205 054413 027270 054412 x.aA.Hhb`.Y...Y.
05260:034217 027220 034131 064131 054132 027520 170131 027220 8...8YhYXZ/P.Y..
05270:064131 054122 014544 150131 002001 027272 044477 074131 hYXR.d.Y....I?xY
05300:027220 050122 002001 027160 060142 050416 027416 014544 ..PR...p`bQ./..d
05310:160155 010467 050463 002001 027220 060205 114301 006021 .m.7Q3....`.....
05320:014544 060155 040372 070206 060500 017510 027220 070001 .d`m@.p.a@.H..p.
05330:060142 050405 027344 050406 027344 017531 027220 002400 `bQ...Q....Y....
05340:070206 070207 070210 027377 034155 034155 160155 001727 p.p.p...8m8m.m..
05350:054501 027356 034155 034155 130155 002001 030370 070207 YA..8m8m.m..0.p.
05360:070210 002400 070206 017531 027402 060142 050406 002001 p...p..Y/.`bQ...
05370:027377 060207 015404 064216 074206 044000 074216 060502 ..`...h.x.H.x.aB
05400:017510 027220 044371 160001 002002 014544 060142 050406 .H..H......d`bQ.
05410:124340 060207 170001 006004 170001 027220 060131 050122 ..`.......`YPR
05420:002001 014544 064132 054117 027475 160001 010402 044371 ...dhZXO/=....H.
05430:050402 027423 006004 040502 002025 027423 002003 014544 Q./...AB../....d
05440:002004 070206 074205 160001 002002 027454 063507 034206 ..p.x...../,gG8.
05450:040377 170001 044477 170001 015404 070206 064205 044500 @...I?....p.h.I@
05460:160001 002002 027473 060131 170001 040206 070131 003004 ..../;`Y..@.pY..
05470:040132 002020 014544 044372 027423 064122 054131 124253 @Z...dH./.hRXY..
05500:060536 170001 006004 060537 170001 006004 027476 005001 a^....a_..../>..
05510:010746 070160 040132 070132 070157 003004 040131 002021 ..pp@ZpZpo..@Y..
05520:014544 064240 160001 170157 006004 034157 034160 027522 .dh....o..8o8p/R
05530:127510 000000 074160 060205 114301 006021 127531 034160 .H..xp`......Y8p
05540:002001 027550 034160 040371 040477 114301 006021 014544 ../h8p@.A?.....d
05550:037531 127531 006101 067552 074233 006400 015535 160205 ?Y.Y.Aojx....]..
05560:034205 010474 070213 002003 027577 015544 002020 027646 8..<p.../.d../.
05570:114301 006007 124337 010402 050402 027661 174137 160205 ........Q./.._..
05600:010467 001727 064000 044345 040506 002020 006400 040520 .7..h.H.AF....AP
05610:002021 006400 002400 160001 010450 070214 120001 001100 .........(p....@
05620:070213 027627 170135 060135 170137 002004 174000 160136 p./..]`].._.....^
05630:010445 003000 040214 002020 027761 002001 034136 064214 .%..@.../...8^h.
05640:044512 006020 044402 044213 015535 027557 050536 027655 IJ..I.H..]/oQ^/.
05650:010402 050402 027736 064216 027576 064205 034205 034205 ..Q./.h./~h.8.8.
05660:027576 074213 064135 015535 164213 015535 060233 170137 /~x.h].]...]`.._
05670:017552 034205 034205 060205 164136 074205 170136 064216 .j8.8.`..^x..^h.
05700:160137 034136 034137 174136 070216 050135 015604 017552 ._8^8_.^p.P]...j
05710:160136 070216 060136 040501 070136 002004 164000 074135 .^p.`^AAp^....x]
05720:002004 164000 074205 015553 170135 060135 002004 174000 ....x..k.]`]....
05730:034137 164137 074233 040477 170137 027577 060213 001727 8_.x.A?._/`...
05740:001700 010410 040351 164000 015535 060233 170137 017552 ....@....]`.._.j
05750:034205 034205 164136 003400 040136 070136 077510 015553 8.8..^..@^p^H.k
05760:127510 160136 007400 044136 074136 001727 010443 040350 .H.^..H^x^...#@.
05770:124000 006216 006054 006054 006054 006054 006220 006224 .....,.,.,.....
06000:006232 006325 006367 006400 100255 100255 100255 100255 ................
06010:006054 006410 006445 006632 006651 011445 002400 070142 .,...%......%..pb
06020:070151 002004 070152 003400 070145 070143 064121 074144 pi..pj..pepchQxd
06030:160361 016120 026035 074413 016107 064132 074137 064131 ...P,.xc.GhZx_hY
06040:074135 044403 074134 074136 007000 044137 006020 025541 x]I.x\x^..H_..+a
06050:002404 114104 064121 026065 124103 060141 064140 150001 ...DhQ,5.C`ah`..
06060:026066 064121 114263 000000 014544 160001 070124 016162 ,6hQ.....d..pT.r
06070:010467 001727 001300 040347 124000 006505 066075 074156 .7....@....El=xn
06100:114303 015563 034137 160001 006004 164001 124156 000000 ...s8_.......n..
06110:006004 160001 003004 002004 070145 006004 074144 126107 ........pe..xd.G
06120:006032 010467 070212 060001 040371 160000 010467 050212 ...7p.`.@....7P.
06130:026137 060001 002004 144000 054122 126120 026123 036120 ,_`.....XR.P,S<P
06140:126120 000000 034145 026152 160361 064144 016120 014544 .P..8e,j..hd.P.d
06150:016107 026142 034145 034145 034144 160144 034144 164144 .G,b8e8e8d.d8d.d
06160:034144 126141 006070 060001 002004 160000 040001 070140 8d.a.8`.....@.p`
06170:160000 070141 044371 074205 160001 126162 000000 160205 ..paH.x....r....
06200:010450 070155 114301 006004 060137 070211 050132 126176 .(pm....`_.p.PZ.~
06210:154000 026214 040374 026206 036176 126176 114303 026054 ..,.@.,.<~.~..,,
06220:006004 160001 070141 026054 114302 002003 026054 034205 ....pa,,.....,,8.
06230:064205 026220 016176 026243 070210 040374 070212 074207 h.,..~,.p.@.p.x.
06240:014627 064207 002401 060504 040137 070137 070207 003004 ..h...aD@_p_p...
```

```
06250:040136 002021 025541 174207 114303 034205 034207 060207 @^..+a....8.8.`.
06260:072353 114302 170207 034207 174207 034207 064500 076141 t.....8...8.i@|a
06270:160205 002002 026276 060534 064371 002001 114302 002020 ....,.a\h.......
06300:036141 170207 034207 174207 034207 060141 170207 160360 <a..8...8.`a....
06310:064140 016120 000000 016162 010450 050155 002001 026307 h`.P...r.(Pm..,.
06320:164137 160001 006004 164001 026352 016176 026054 070137 ._......,..~,,p_
06330:076346 002004 072353 040371 070207 064500 076141 160207 |...t.@.p.i@|a..
06340:034207 164207 034207 002020 036141 017340 000000 172346 8...8...<a......
06350:036346 176346 017346 000000 036141 001600 002020 026363 <.......<a....,.
06360:160207 070141 026054 060137 040374 070137 026054 006004 ..pa,,`_@.p_,,..
06370:160001 064141 070141 015535 040510 050134 014544 026054 ..hapa.]AHP\.d,,
06400:064136 054134 014544 160136 070141 044477 074136 026054 h^X\.d.^paI?x^,,
06410:054140 026054 114303 160137 070157 016141 170157 034157 X`,,...._po.a.o8o
06420:174157 034137 064205 006004 026410 001772 002400 114104 .o8_h...-.....D
06430:003400 040116 070125 060142 003004 070126 002011 126425 ..@NpU`b..pV....
06440:040477 070126 002400 015773 126425 016425 002400 026454 A?pV..........-,
06450:002400 050153 015730 003400 070153 160205 010474 002002 ..Pk....pk...<..
06460:026500 034205 064205 054140 026544 160205 010467 050452 -@8.h.X`-d...7Q*
06470:026450 050453 026453 050451 026515 003400 040205 070205 -(Q+-+Q)-M..@.p.
06500:003400 070153 002404 114104 114302 071711 002400 114104 ..pk...D..s....D
06510:061711 034153 026461 015711 026461 002400 070153 070160 c.8k-1..-1..pkpp
06520:070157 160001 010445 002003 026535 034157 006004 160001 po...%..-]8o....
06530:010467 050451 026535 034157 026521 064157 044126 044524 .7Q)-]8o-QhoHVIT
06540:006021 015753 114273 026455 034153 026562 064142 007004 .......--8k-rhb..
06550:060126 003004 070142 040001 004010 040477 064116 002002 `V..pb@...A?hN..
06560:114112 002001 015753 002404 114104 026054 116616 026610 .J.......D,,..-.
06570:006400 074153 040523 002021 026610 003004 040523 040126 ..xkAS..-...AS@V
06600:002021 124334 070157 060411 015773 034157 026603 124334 ....poa...8o-...
06610:002400 114104 015753 002404 114104 124334 011400 002006 ...D.....D......
06620:114256 014642 026617 064205 006004 054140 026643 050400 ....-.h...X`-.Q.
06630:026634 026635 002400 114104 114256 114303 003400 140137 -.-....D......._
06640:034137 070133 026621 002400 070142 002404 114104 026054 8_p[-...pb...D,,
06650:100233 064143 054477 026054 016107 026054 006715 006775 ..hcY?,,.G,,....
06660:007021 007024 007027 007032 007035 007157 007164 007210 ..........o.t..
06670:007171 007222 007225 100330 100332 007233 007241 007246 .y.............
06700:007176 007203 007023 162702 072712 036702 015563 076713 .~......u.=..s}.
06710:034137 015553 017340 072705 126702 016764 034136 016764 8_.k..u.....8^..
06720:164137 044371 160001 010445 070157 160001 001727 010445 ._H....%po.....%
06730:003004 140136 002021 026752 060157 050370 026742 015317 ...^..-.`oP.-...
06740:100136 002001 160136 007400 044136 074136 064157 007004 .^...^..H^x^ho..
06750:144136 006021 014544 140136 001000 164137 140001 170137 .^...d.^..._..._
06760:064136 044477 074136 124330 000000 015563 160001 006004 h^I?x^.....s....
06770:164001 015421 174136 034137 126764 064214 006002 124333 .....^8_..h.....
07000:054213 027015 160137 070216 060213 164000 174216 034216 X...._p.`.....8.
07010:002004 164000 174216 034137 124332 015563 074213 034137 ......8_...sx.8_
07020:027002 016702 017340 124331 016702 017346 124331 016702 ................
07030:017417 124331 016702 017466 124331 164137 160001 006004 .......6..._....
07040:164001 015432 027045 102301 027060 016702 027047 017137 .....%...0...'._
07050:002020 014544 066712 114304 017417 106713 114305 124331 ...dm...........
07060:074221 006020 007004 074223 016702 027066 017137 066712 x.....x....6._m.
07070:072712 076713 060534 070211 060371 070212 064223 004031 u.}.a\p.`.p.h...
07100:027117 074223 006002 027130 060221 002020 027112 060211 .Ox....X`....J`.
07110:064212 124331 060534 064371 017466 000211 124331 074223 h...a\h..6....x.
07120:062712 066713 017417 000211 070211 074212 064223 027102 e.m.....p.x.h..B
07130:062712 066713 017417 006712 072712 076713 027076 000000 e.m.....u.}..>..
07140:076712 166713 002002 027154 006003 014544 006021 027214 }......l...d....
07150:014544 060471 064500 124331 006003 027217 127137 016702 .da9i@......._..
07160:017346 002020 027214 027212 016702 017346 002020 027217 ................
07170:027214 016702 017346 002002 027214 027217 016702 017346 ................
07200:002020 027214 027217 016702 017346 002020 027217 027173 ..............{
07210:016702 017346 002002 027217 002400 006400 124331 060534 ..............a\
07220:064371 124331 015553 015471 124331 034136 064454 015535 h....k.9..8^i,.]
07230:015544 015604 027217 016702 027235 002002 027217 162713 .d..............
07240:027212 016702 027243 002003 027214 027237 015553 002002 ............k..
07250:027214 027217 007345 063252 070203 060157 003004 040150 ......f.p.`o..@h
07260:002021 027277 060227 064230 070230 074227 060231 064232 ....`.h.p.x.`.h.
07270:070232 074231 060150 064157 070157 074150 027256 040516 p.x.`hhopoxh..AN
07300:064231 002021 027331 003100 040516 070157 060230 064232 h......@ANpo`.h.
07310:034157 027334 044231 103101 005326 000040 040227 004010 8o..H..A... @...
07320:002004 005566 102301 027332 001500 005500 034150 027332 ...v.....@.@8h..
07330:002001 060227 015077 124203 000071 002200 005540 027310 ..`..?...9...`..
07340:010105 017367 063340 070161 017252 124161 110444 017367 .E..f.pq...q.$..
07350:063346 070161 060230 003000 007006 027363 002025 002021 f.pq`..........
```

```
07360:027363 001300 034157 074232 070230 017252 124161 007342  ....8ox.p....q..
07370:070227 002003 006404 015524 074231 070150 063367 040500  p......Tx.phf.A@
07400:164000 134000 164001 005275 027402 160001 006004 164001  ......../.......
07410:070230 002003 006404 015524 074232 070157 127367 177777  p......Tx.po....
07420:017367 040150 002004 070150 005300 060001 015317 000227  ..@h..ph..`.....
07430:070232 063417 070161 060231 001300 074231 015317 000230  p.g.pq`...x.....
07440:044231 000040 040232 002040 006004 074232 060227 015317  H.. @.. ..x.`...
07450:000230 000065 040232 000066 002041 027461 102201 006005  ...5@..6.!/1....
07460:044477 070227 060001 064227 015077 124161 011006 017367  I?p.`.h..?.q....
07470:067466 074161 064230 006003 027553 064227 006003 027550  o6xqh.../kh.../h
07500:003004 002004 040150 070150 060231 004071 002200 001500  ....@hph`..9...@
07510:004071 002200 001500 017557 070157 005100 002400 017557  .9...@.opo.@...o
07520:070162 064232 002500 005521 005100 017557 003004 015317  prh..@.Q.@.o....
07530:000157 005066 060162 002020 003401 002400 003040 002004  .o.6`r....... ..
07540:003100 044162 002040 002004 004066 001600 040157 002001  .@Hr. ...6..@o..
07550:002400 015077 124161 014544 060227 015164 124161 007526  ...?.q.d`..t.q.V
07560:074227 064230 006120 007204 077340 007004 077346 064513  x.h..P..~...~.iK
07570:074231 064500 074147 077417 064227 006021 027604 037417  x.i@xg.h.../.?.
07600:007200 002002 003005 006004 002040 034147 000066 005600  ......... 8g.6..
07610:047346 006021 002005 047340 034231 027606 003004 034147  N.....N.8./...8g
07620:003004 037417 127557 007004 127557 005571 070211 010402  ..?..o...o.yp...
07630:040502 002024 027636 060211 070001 027650 002020 027645  AB../.`.p./.../.
07640:060211 010505 070001 006004 027650 007400 060372 030211  `..Ep.../...`.0.
07650:070212 074213 064132 027674 160001 050211 127625 050212  p.x.hZ/...P...P.
07660:027701 050213 027701 160001 010402 050402 027673 040502  /.P./.....Q./.AB
07670:002020 006004 006004 044371 054117 007401 027654 060211  ......H.XO../.`.
07700:127625 060211 034213 002001 170001 127625 000336 002062  ..`.8..........2
07710:002134 002223 000776 002606 002333 002346 002373 002405  .\..............
07720:002412 002432 002440 002452 002465 177777 177777 000671  ..... .*.5......
07730:002511 002543 002555 002621 002632 002705 002725 002737  .I.c.m..........
07740:002750 002771 003010 003133 003207 003237 003465 003500  .......[.....5.@
07750:004243 000337 003333 002160 005321 005422 005273 005521  .......p......Q
07760:005550 005310 005406 005440 001420 005473 006753 001574  .h..... ...;...|
07770:007052 007146 006065 006377 006403 006150 001542 011760  .*.f.5.....h.b..
10000:012044 012106 012712 010401 010752 011060 001161 001155  .$.F.......0.q.m
10010:011132 011266 007554 007151 001720 070236 062014 070164  .Z...l.i..p.d.pt
10020:060236 002041 026034 002021 026031 015471 070236 060422  `..!,...,..9p.a.
10030:002001 060411 070147 060236 074163 015432 000000 160164  ..a.pg`.xs.....t
10040:072060 072116 034164 102201 026067 002400 074222 044531  t0tN8t..,7..x.IY
10050:006021 040372 040374 040126 003004 070220 040435 002020  ..@.@.@V..p.A...
10060:000044 060147 002002 015773 060222 114272 124164 003400  .$`g....`....t..
10070:070204 060236 002003 025573 064163 114306 000540 002021  p.`...+{hs...`..
10100:026110 060236 064163 114306 000542 064401 002021 034204  ,H`.hs...bi...8.
10110:064402 044126 007004 074220 044436 006020 072733 060236  i.HV..x.I...u.`.
10120:070234 064163 015524 074235 070150 060147 002002 015773  p.hs.Tx.ph`g....
10130:002400 070236 050150 026156 015230 060150 003004 002020  ..p.Ph,n..`h....
10140:026143 034236 026134 015261 060236 064150 007004 006021  ,c8.,\..`.hh....
10150:026156 070236 015261 003400 040236 026145 003000 070236  ,np.....@.,e..p.
10160:064505 074165 007400 074157 054204 026174 003000 070157  iExu..xoX.,|..po
10170:050370 026200 002021 026206 016325 040425 015773 026210  P.,...,..A..,...
10200:060423 015773 060425 026207 034157 026174 060423 015773  a...a.,.8o,|a...
10210:034165 026204 060126 072060 060125 072116 016325 040503  8u,.`Vt0`UtN..AC
10220:002020 026264 003400 070166 016351 050423 026222 015636  ..,...pv..Q.,...
10230:026243 050377 026235 040426 026257 060425 015773 016351  ,.P.,.A.,.a.....
10240:003400 040166 026223 015773 034236 000000 060426 064204  ..@v,...8..a.h.
10250:006002 026257 015773 060425 034166 026252 060423 015773  ..,...a.8v,.a...
10260:062060 070126 062116 070125 034204 026314 060432 015773  d0pVdNpU8.,.a...
10270:060422 064236 006020 007005 060421 074236 015773 064236  a.h......a.x...h.
10300:060425 044510 006020 026306 002004 026301 044427 074236  a.IH..,...,..I.x.
10310:015773 060236 015773 124164 016351 050425 026321 015773  ..`....t..Q.,...
10320:124164 060411 015773 016351 026314 010217 015230 064150  .ta.....,.....hh
10330:007004 010476 001200 006024 026332 010445 070162 064150  ...>....,..%prhh
10340:007004 001300 006024 026341 020234 064235 015174 060162  ......,. .h..|`r
10350:126325 010315 064126 044477 074126 160125 006011 001727  ....hVI?xV.U....
10360:010445 004010 126351 064125 044477 074126 126351 114310  .%....hUI?xU....
10370:010456 072462 076463 114306 010460 017427 177776 017400  ..u2}3...0......
10400:014544 017417 015471 017427 000002 114306 010462 072462  .d...9......2u2
10410:076463 114307 010460 070204 002020 026450 062470 066471  }3...0p...-(e8m9
10420:114307 010462 072464 076465 114310 010464 114310 010470  ...2u4}5...4...8
10430:114307 010460 017305 010472 114310 010464 072464 076465  ...0...:..4u4}5
10440:060204 002020 026453 062460 066461 114311 010464 124334  `...-+e0m1...4..
10450:062462 066463 026422 062464 066465 124334 050574 141002  e2m3-.e4m5..Q|..
10460:040000 000002 060000 000000 067331 166002 000000 000000  @...`...n.......
```

```
10470:040000 000004 076061 075315 066034 176725 057035 030335 @...|1z.l...^.0.
10500:050755 114745 043523 052355 076112 065763 066520 163773 Q...GST.|Jk.mP..
10510:070512 014002 000000 072462 076463 060001 010445 070204 qJ....u2}3`..%p.
10520:002002 000010 026557 062460 066461 114311 010462 072466 ....-oe0m1...2u6
10530:076467 114310 010466 114310 010470 114307 010460 017305 }7...6...8...0..
10540:010576 114310 010466 072464 076465 060204 002002 000010 .~...6u4}5`.....
10550:026562 062462 002020 026565 062572 066573 026567 062462 -re2..-uezm{-we2
10560:066463 026527 062464 066465 124334 062574 066575 114307 m3-We4m5..e|m}..
10570:010464 124334 062207 166402 115570 011402 106671 102315 .4..d....x......
10600:056335 156323 131601 137731 040033 035737 111013 123343 \.......@.;.....
10610:060542 000351 122573 062757 055471 107365 111620 147373 ab...{e.[9......
10620:070320 155002 000000 114306 010572 114310 010675 072462 p........z....u2
10630:076463 114306 010460 017427 177776 017400 026400 017417 }3...0......-...
10640:114310 010677 114306 010462 072462 076463 114307 010460 .......2u2}3...0
10650:002020 026660 062470 066471 114307 010462 072462 076463 ..-.e8m9...2u2}3
10660:062462 066463 114310 010462 017427 000001 114307 010460 e2m3...2......0
10670:017305 010701 114310 010462 124334 050574 141000 100000 .......2..Q|....
10700:000004 047605 072733 134143 104751 045261 157365 133371 ..O.u..c..J.....
10710:014777 050656 107004 000000 002020 015471 124334 002400 ..Q........9....
10720:070150 060151 001000 040151 064152 004065 040001 064152 ph`i..@ihj.5@.hj
10730:005275 002004 004066 044152 001675 002104 044536 002040 .....6Hj...DI^.
10740:002004 001665 070151 074152 015077 124334 002003 124334 ....pixj.?......
10750:002020 014544 072462 015524 000031 027015 040477 073013 ...du2.T....A?v.
10760:076463 062462 114310 011030 114306 011034 072464 076465 }3e2.......u4}5
10770:062462 066463 114311 010464 114306 010464 017427 177777 e2m3...4...4....
11000:072464 076465 062462 066463 114311 010464 114306 010464 u4}5e2m3...4...4
11010:072464 076465 017427 000000 124334 073013 044445 076463 u4}5......v.I%}3
11020:062462 114310 011026 114306 011032 026766 070000 000000 e2........-.p...
11030:045000 000000 043524 046377 066000 000377 074204 064410 J...GTL.l...x.i.
11040:074150 064204 015432 027046 015077 124334 060172 064204 xhh....&.?..`zh.
11050:124334 017053 124334 000000 002020 027131 002020 014544 ...+.......Y...d
11060:072462 015524 076463 017417 072464 076465 062462 066463 u2.T}3..u4}5e2m3
11070:114306 011135 072466 076467 062462 066463 114307 011135 ...]u6}7e2m3...]
11100:114311 010466 072466 076467 114310 010466 114307 011145 ...6u6}7...6...e
11110:072462 076463 063143 067144 114311 010462 114306 011141 u2}3fcnd...2...a
11120:114310 010466 114307 000534 114306 010464 114310 011137 ...6...\...4..._
11130:127053 014544 060536 064447 127053 055202 075000 054271 .+.da^i'.+Z.z.X.
11140:006000 051260 037402 125606 044404 065010 063002 006400 ..R.?...I.j.f...
11150:002003 124334 002021 064371 060536 006002 001300 124334 ......h.a^......
11160:017162 124334 000000 114310 011303 072462 076463 017400 .r.......u2}3..
11170:027262 073255 017417 072464 076465 063255 043271 002021 ..v...u4}5f.F...
11200:027265 043272 002020 027257 062462 066463 114307 010464 ..F.....e2m3...4
11210:072462 076463 114310 010462 072466 076467 114306 011273 u2}3...2u6}7....
11220:072464 076465 063275 067276 114311 010464 072464 076465 u4}5f.n....4u4}5
11230:063277 067300 114310 010466 114306 011301 114307 010462 f.n....6.......2
11240:114307 010464 072464 076465 062462 066463 114311 010464 ...4u4}5e2m3...4
11250:114306 000534 037255 000000 017427 000000 127162 002400 ...\>........r..
11260:006400 127162 063366 002020 027257 014544 060471 064500 ...rf......da9i@
11270:127162 177604 000364 053552 160416 046477 016424 043372 .r....Wj..M?..F.
11300:070371 047643 001410 056125 017002 000000 073400 063305 p.O...\U....w.f.
11310:070146 063400 114310 010470 073366 077367 164146 077374 pfg....8v.~..f~.
11320:160001 006004 164001 073376 077377 002400 073372 073373 ......v.~...v.v.
11330:037374 037374 163374 002003 027356 063372 067373 073370 >.>.......f.n.v.
11340:077371 063376 067377 073372 077373 114310 011366 114307 ~.f.n.v.~.......
11350:011370 114306 111374 073376 077377 027330 063376 067377 ......v.~...f.n.
11360:114307 011370 114310 000534 034146 124146 067331 166000 .......\8f.fn...
11370:000000 000000 000000 000000 000000 000000 000000 000000 ................
11400:000000 073366 060001 010445 000033 027411 040512 002021 ..v.`..%../.AJ..
11410:127400 037400 063366 015432 000000 060001 127400 000000 ..?.f.....`.....
11420:067417 074154 064402 074150 006400 015077 124154 011014 o.xli.xh...?.l..
11430:002003 027443 073366 015524 077367 143427 001200 010445 ../#v..T~......%
11440:070001 047367 063366 037427 127427 160205 034205 010450 p.N.f.?.....8..(
11450:002002 027602 160205 010467 070217 050465 002001 114320 ../....7p.Q5....
11460:160205 010450 002003 072550 114301 006400 124337 034205 ...(../h.....8.
11470:160001 070221 060217 050465 027553 044371 160001 070222 ..p.`.Q5/kH...p.
11500:010445 003004 070223 070224 160001 001727 010445 003004 .%..p.p......%..
11510:070225 114325 002400 070226 060205 050140 027527 160205 p.....p.`.P`/W..
11520:010467 050453 034226 027527 006400 054226 015730 160221 .7Q+8./W..X.....
11530:034221 164221 034221 015711 034223 027524 015753 015753 8...8...8./T....
11540:060224 070223 034225 027527 064205 054140 002001 027460 `.p.8./Wh.X`../0
11550:002404 114104 124326 074223 160205 010467 064205 054140 ...D..x....7h.X`
11560:002400 050461 017724 060223 040371 160000 015404 001100 ..Q1..`.@......@
11570:003004 070225 114324 170221 034221 174221 034221 034225 ..p.....8...8.8.
```

```
11600:027572 027544 114301 006004 160001 070225 074223 044371 /z/d......p.x.H.
11610:160001 070226 002404 070154 160205 034205 002020 027703 ..p...pl..8.../.
11620:010450 002003 027673 114301 006004 160001 070221 044371 .(../.......p.H.
11630:160001 070222 064205 054140 027654 160205 001100 001727 ..p.h.X`/....@..
11640:010430 040504 070154 160205 010450 114301 006004 160001 ..ADpl...(......
11650:070223 044371 160001 070224 060154 043660 114000 124326 p.H...p.`lG.....
11660:111660 012131 012111 012124 012337 012176 012153 012204 ...Y.I.T...~.k..
11670:012447 012274 012145 060400 070154 114302 070217 074220 .'...ea.pl..p.x.
11700:034205 034205 027614 001727 001700 010410 040506 070154 8.8./.......AFpl
11710:040506 002020 027717 160205 034205 034205 027620 064205 AF../...8.8./.h.
11720:054140 027654 017724 027654 000000 017761 005727 074226 X`/.../.......x.
11730:006404 034205 160205 010467 050456 027740 017761 034205 ..8....7Q./...8.
11740:034205 044226 074226 060223 040371 174000 040477 160000 8.H.x.`.@...A?..
11750:015404 070220 060226 015404 003004 040220 002020 014544 ..p.`.....@....d
11760:127724 000000 114302 015421 006004 060001 040527 002021 ..........`.AW..
11770:124342 127761 006566 010625 010623 010367 010513 011160 .....v......K.p
12000:011051 010714 010746 011036 010717 011147 000000 060224 .).........g..`.
12010:064222 016040 060222 064226 016040 015317 013123 003004 h.. `.h.. ...S..
12020:073142 160221 034221 164221 034221 000000 000000 170225 vb..8...8.......
12030:034225 174225 034225 000000 000000 037142 026021 126006 8...8.....>b,...
12040:000000 050001 002001 014544 001727 010445 073123 060001 ..P....d...%vS`.
12050:010445 073124 126040 000000 062053 072057 026063 000000 .%vT. ..d+t/,3..
12060:064223 060224 016067 064221 060222 016067 126067 000000 h.`..7h.`..7./..
12070:077126 015404 001100 003004 073127 163126 037126 167126 ~V...@..vW.V>V.V
12100:037126 050536 026104 026106 054537 014544 037127 026075 >VQ^,D,FY_.d>W,=
12110:126067 000000 063143 072025 063144 072026 063147 072033 .7..fct.fdt.fgt.
12120:072034 016057 016006 126111 000000 062124 072111 063145 t../...I..dTtIfe
12130:026113 000000 062131 072006 002400 006400 072025 076026 ,K..dYt.....t.|.
12140:002400 072033 072034 016053 026012 000000 062145 072006 ..t.t..+,...det.
12150:063146 064367 026136 000000 060534 064371 070217 074220 ffh.,^..a\h.p.x.
12160:060226 015404 001100 003004 073142 060217 064222 170225 `....@..vb`.h...
12170:034225 174225 034225 037142 026167 126153 000000 062176 8...8.>b,w.k..d~
12200:072153 002400 006400 026156 000000 060225 073131 016176 tk....,n..`.vY.~
12210:060226 001727 050226 001010 026043 010450 070217 001100 `...P...,#.(p..@
12220:003004 070220 067131 074225 060534 170001 006004 060371 ..p.nYx.a\....`.
12230:170001 006004 044217 034220 026224 126204 000000 016256 ....H.8.,......
12240:112236 036236 162272 036272 166272 126236 000000 016256 ..<...<.........
12250:112246 036246 172272 036272 176272 126246 000000 072273 ..<...<.......t.
12260:162256 072272 062273 162272 001275 026261 072272 062273 ..t.d.....,.t.d.
12270:036256 126256 000000 000000 000000 016053 060226 001727 <.........+`...
12300:064222 016040 015317 013123 073142 063124 003004 073125 h.. ...SvbfT..vU
12310:002400 073126 067126 005000 044221 160001 006004 164001 ..vVnV..H.......
12320:170225 034225 174225 034225 063126 043124 073126 053142 ..8...8.fVFTvVVb
12330:026332 026312 034221 034221 037125 026310 126274 000000 ,.,.8.8.>U,.....
12340:016057 060226 010445 073126 060224 010445 053126 002001 ./`..%vV`..%VV..
12350:026043 060226 010527 070001 060224 001727 010445 040001 ,#`..Wp.`....%@.
12360:064222 016040 060223 073125 063123 003004 073131 063126 h.. `.vUfS..vYfV
12370:003004 073132 063125 070223 002400 073133 073134 006400 ..vZfUp...v[v\..
12400:016246 100225 064221 047134 077140 064223 047133 016236 ....h.N\~`h.N[..
12410:100001 114310 113140 114306 100225 016246 100225 037134 .....`.......>\
12420:037134 063126 001000 043133 073133 063124 001000 053134 >\fV..F[v[fT..V\
12430:026432 026402 034225 034225 034223 034223 037132 026374 -.-.8.8.8.>Z,.
12440:063124 001000 040221 070221 037131 026367 126337 000000 fT..@.p.>Y,.....
12450:016053 060222 064226 016040 060225 073135 060222 015404 .+`.h.. `.v]`...
12460:003004 001100 073122 001000 064136 006004 074223 074225 ...@vR..h^..x.x.
12470:007004 044137 040001 002020 025541 016131 063135 070225 ..H_@...+a.Yf]p.
12500:016204 063135 070225 002400 073134 073135 060223 070221 ..f]p...v[v]`.p.
12510:160221 034221 164221 034221 002020 015471 073140 077141 ..8...8....9v`~a
12520:114307 013134 002020 026530 063140 067141 073134 077135 ...\..-Xf`nav\~]
12530:037122 026510 063134 067135 114310 013136 070217 074220 >R-Hf\n]...^p.x.
12540:002400 073142 037124 037142 063142 053124 126447 063142 ..vb>T>bfbVT.'fb
12550:067142 073122 017075 073121 002400 073134 073135 016236 nbvR.=vQ..v\v]..
12560:113121 002020 015471 073140 077141 114307 013134 002020 .Q...9v`~a...\..
12570:026577 063140 067141 073134 077135 063122 073125 037122 -f`nav\~]fRvU>R
12600:063122 053124 026610 063123 001000 043133 073121 026557 fRVT-.fS..FQvQ-o
12610:063142 006404 017075 073121 063125 006404 017075 073122 fb...=vQfU...=vR
12620:063142 006404 017107 073131 073132 063125 006404 017107 fb...GvYvZfU...G
12630:073133 063123 003004 073134 016236 113121 073140 077141 v[fS..v\...Qv`~a
12640:016236 113122 173121 037121 177121 037121 063140 067141 ...R.Q>Q.Q>Qf`na
12650:173122 037122 177122 037122 016236 113131 073140 077141 .R>R.R>R...Yv`~a
12660:016236 113133 173131 037131 177131 037131 063140 067141 ...[.Y>Y.Y>Yf`na
12670:173133 037133 177133 037133 037134 026634 063142 067142 .[>[.[>[>\-.fbnb
12700:017075 073121 016236 113121 002020 015471 114307 000217 .=vQ...Q...9....
```

```
12710:002020 014544 063121 073122 060534 064371 114311 113121 ...dfQvRa\h....Q
12720:073140 077141 063142 073133 037133 063133 053124 026741 v`~afbv[>[f[VT-.
12730:037122 037122 016236 113122 114310 013140 016246 113122 >R>R...R...`...R
12740:026724 063132 073125 063123 003004 073133 016236 113125 -.fZvUfS..v[...U
12750:002003 006002 026754 026760 114310 013140 016246 113125 ....-.-....`...U
12760:037125 037125 037133 026746 002400 070221 034221 060221 >U>U>[-...p.8.`.
12770:053124 026543 053142 026766 060221 006404 017107 073133 VT-cVb-.`....Gv[
13000:060221 067142 017075 073131 016236 100000 073127 077130 `.nb.=vY....vW~X
13010:063142 073135 063121 073122 037135 063135 053124 027041 fbv]fQvR>]f]VT.!
13020:037131 037131 037122 037122 063127 067130 114310 113122 >Y>Y>R>RfWnX...R
13030:073140 077141 016236 113131 114307 013140 016246 113131 v`~a...Y...`...Y
13040:027014 063132 073125 063123 003004 073135 163125 037125 ..fZvUfS..v].U>U
13050:167125 037125 002003 006002 027056 027070 114310 013127 .U>U.......8...W
13060:073140 077141 016236 113133 114307 013140 016246 113133 v`~a...[...`...[
13070:037133 037133 037135 027046 026766 000000 077127 040477 >[>[>].&-...~WA?
13100:015317 013123 043127 040477 001000 040223 127075 000000 ...SFWA?..@..=..
13110:077127 040477 015317 013123 043127 040477 001000 040225 ~WA?...SFWA?..@.
13120:127107 000000 000000 000000 000000 000000 000000 000000 .G..............
13130:000000 000000 000000 000000 000000 000000 041433 157733 ............C...
13140:000000 000000 000000 114306 100223 114307 114310 034223 ..............8.
13150:000000 064500 015355 002305 127150 037150 060461 170133 ..i@.....h>ha1.[
13160:117201 007400 015355 002245 002001 117201 064500 015355 ............i@..
13170:002251 127200 060456 170133 034133 015662 124322 127150 ....a..[8[.....h
13200:003206 003045 000000 074456 074423 074442 013450 072550 ...%..y.y.y".(uh
13210:072712 072712 072551 013450 013450 000000 000000 060354 u.u.ui.(.(....`.
13220:000043 000000 000000 000000 000000 072722 000000 000000 .#........u.....
13230:000000 000000 000000 000000 000000 000000 000000 000000 ................
13240:000000 000000 000000 000000 000000 000000 000000 000000 ................
13250:000000 000000 000000 000000 000000 000000 000000 000000 ................
13260:000000 000000 000000 000000 000000 000000 000000 000000 ................
13270:000000 000000 005037 000071 177766 000000 000000 000000 .......9........
13300:000000 000000 000000 000000 000000 000000 000000 000000 ................
13310:000000 000000 000000 000000 000000 000000 000000 000000 ................
13320:000000 000000 000000 000000 000000 000000 000000 000000 ................
13330:000000 000000 000000 000004 051117 047524 031461 045527 ........ROOT31KW
13340:020115 051525 020102 040523 044503 020040 020040 020040   MSU BASIC
13350:020040 020040 020040 020040 020040 020040 020040 020040
13360:020040 020040 020040 020040 020040 020040 020040 020040
13370:020040 020040 020040 020040 020040 020040 020040 020040
13400:020040 020040 000000 000000 000000 000000 000000 000000         ..........
13410:000000 000000 000000 000000 000000 000000 000000 000000 ................
13420:000000 000000 000000 000000 000000 000000 000000 000000 ................
13430:000000 000000 000000 000000 000000 000000 000000 000000 ................
13440:000000 000000 000000 000000 000000 000000 000110 013336 ..............H..
13450:000144 000007 032026 107000 040000 000002 000000 000156 .d..4...@......n
13460:000007 032027 107000 040000 000004 000000 000170 000011 ..4...@......x..
13470:032030 107237 023026 010027 000000 004000 000000 000202 4...&...........
13500:000023 053000 001123 050525 040522 042440 051117 047524 ..V..SQUARE ROOT
13510:020117 043000 001026 000000 001053 001027 000000 001075  OF......+.....=
13520:001030 000000 000214 000003 045000 166002 000000 067331 ........J.....n.
13530:166002 000000 003402 000000 000000 000000 000000 000000 ................
13540:000000 000000 000000 000000 000000 000000 000000 000000 ................
13550:000000 000000 003402 010746 000000 000000 003402 010746 ................
13560:000000 004007 000000 000000 000000 000000 000000 000000 ................
13570:000000 000000 000000 000000 000000 000000 000000 000000 ................

[13600 to 67077 all zeroes, removed]

67100:000000 000000 000000 000000 000000 000000 000000 000000 ................
67110:000000 000000 000000 000000 000000 106700 017475 017475 ............[.=.=
67120:063641 067642 017345 060373 067571 017403 050371 002001 g.o...`.oy..P...
67130:027117 067571 017501 027117 163571 173576 017475 063646 .Ooy.A.O.y.~.=g.
67140:067647 017345 060373 067571 017403 050371 002001 027136 o...`.oy..P....^
67150:067571 017501 027136 002003 027136 043637 002021 027136 oy.A.^...^G....^
67160:163571 173574 017475 063654 067655 017345 060373 067571 .y.|.=g.o...`.oy
67170:017403 050371 002001 027162 067571 017501 027162 173572 ..P....roy.A.r.z
67200:163571 173575 017475 063661 067662 017345 060374 067571 .y.}.=g.o...`.oy
67210:017403 050373 002001 027202 060371 067571 017501 027202 ..P......`.oy.A..
67220:173570 040516 002021 027202 060371 067571 006004 017501 .xAN....`.oy...A
67230:027202 173567 043640 002021 027202 017475 167634 177563 ...wG......=...s
67240:006404 074063 177560 063562 067622 044063 164001 170001 ..x3.pgro.H3....
67250:060536 067615 044063 164001 170001 063627 040063 160000 a^o.H3....g.@3..
67260:160000 064064 117565 000005 060115 043556 070116 070117 ..h4.u..`MGnpNpO
```

```
67270:043555 070120 040477 070115 060114 070121 070122 060411  GmpPA?pM`LpQpRa.
67300:070411 002400 070124 067627 044063 164001 164001 117564  q...pTo.H3.....t
67310:034063 137560 137563 027243 106711 064443 106611 106611  83.p.s....i#....
67320:000000 000000 000000 002400 173573 003400 173557 163634  .........{...o..
67330:003004 070063 106711 106711 000000 000000 000000 060373  ..p3...........`.
67340:102610 102704 103710 102100 127562 067500 073577 077600  .......@.ro@w.
67350:067601 106611 002003 027376 002021 003004 073603 067604  o...........w.o.
67360:163600 005200 004010 037600 006011 001727 010443 030444  ......?......#1$
67370:017456 037603 027360 063577 002020 127345 063605 017456  ..?...g....g...
67400:063606 017456 127345 067211 003004 073603 073607 077600  g.....n...w.w..
67410:077610 006400 077611 017464 002003 027413 053606 027413  .....4../.W./.
67420:053605 027445 053613 027447 053612 027447 067603 006006  W./%W./'W./'o...
67430:006020 002001 027413 077603 067611 006015 001737 133600  ..../..o.......
67440:173600 006011 037600 077611 027413 063611 127403 002400  ....?../.g.....
67450:017345 063607 073603 063610 073600 027411 067402 102611  ..g.w.g.w./.o...
67460:103711 102311 027461 127456 067414 067602 106611 103711  ..../1..o.o...
67470:102311 027470 102511 010443 127464 067236 002400 017345  ../8.I.#.4n.....
67500:127475 067231 003007 027553 077577 073600 002400 073610  .=n.../kw...w.
67510:073611 067611 163577 006011 001727 010443 050411 027544  w.o.......#Q./d
67520:002003 027544 073635 043636 002020 027544 040510 002021  ../dw.G.../dAH..
67530:027544 063635 010402 067610 103101 005020 047610 005000  /dg...o..A..O...
67540:044000 077610 102201 027554 037611 067611 006011 037577  H..../l?.o...?
67550:037600 027512 063610 037501 127501 177637 177670 075066  ?./Jg.?A.A....z6
67560:075077 073465 073205 075070 074251 074774 074000 073556  z?w5v.z8x.y.x.wn
67570:073557 073763 073560 073555 073431 073433 073435 000000  wow.wpwmw.w.w...
67600:000002 120000 160000 177776 052525 000015 000012 177772  ........UU......
67610:000013 000002 000033 000176 000000 067615 075121 075134  .......~..o.zQz\
67620:075147 075162 067622 074423 074517 074554 074611 067627  zgzro.y.yOyly.o.
67630:000071 000072 000073 000074 075052 000061 177720 177763  .9.:.;.<z*.1....
67640:177703 177772 067643 054505 040522 037440 177771 067650  ....o.YEAR? ..o.
67650:046517 047124 044077 020040 177773 067656 042101 054477  MONTH?  ..o.DAY?
67660:020040 177772 067663 052111 046505 037440 000000 000000    ..o.TIME? ....
67670:000000 000000 000000 000000 000000 000000 000000 000000  ..............

[67700 to 72537 all zeroes, removed]

72540:000000 000000 000000 000000 000000 000000 000000 000000  ..............
72550:000000 041000 042440 020105 047104 020124 020042 051521  ..B.E  END T "SQ
72560:052501 051105 020122 047517 052040 047506 021101 030442  UARE ROOT OF"A1"
72570:025442 040462 021075 021101 031400 000000 000000 000000  +"A2"="A3.......
72600:000000 000000 000000 000000 000000 000000 000000 000000  ..............
72610:000000 000000 000000 000000 000000 000000 000000 000000  ..............
72620:000000 000000 000000 000000 000000 000000 000000 000000  ..............
72630:000000 000000 000000 000000 000000 000000 000000 000000  ..............
72640:000000 000000 000000 000000 000000 000000 000000 000000  ..............
72650:000000 000000 000000 000000 000000 000000 000000 000000  ..............
72660:000000 000000 000000 000000 000000 000000 000000 000000  ..............
72670:000000 000000 000000 000000 000000 072705 013527 013527  ..........u..W.W
72700:072702 000030 067331 166002 000027 040000 000004 000026  u...n.....@.....
72710:040000 000002 041131 042400 051105 020122 047517 052040  @...BYE.RE ROOT
72720:047506 020061 020040 020040 025440 031040 020040 020075  OF 1    + 2    =
72730:020061 027067 031462 030065 020040 020040 000000 000000   1.73205    ....
72740:000000 000000 000000 000000 000000 000000 000000 000000  ..............
72750:000000 000000 000000 000000 000000 000000 042522 051040  ............ERR
72760:031060 035061 031460 000000 000000 000000 000000 000000  20:130..........
72770:000000 000000 000000 000000 000000 000000 000000 000000  ..............
73000:000000 000000 000000 000000 000000 000000 000000 000000  ..............
73010:000000 000000 000000 000000 000000 000000 000000 000000  ..............
73020:000000 000000 000000 002400 114112 063564 002002 027445  .........Jgt../%
73030:063563 073564 102611 067065 063065 002006 027035 006006  gswt..n5f5......
73040:027034 060063 030425 001727 073064 063054 067055 117656  ..`31...v4f,n-..
73050:117657 002400 073564 124255 000015 073056 003407 003407  ....wt....v.....
73060:046523 043440 041510 035040 000000 177014 013333 177777  MSG CH: ........
73070:177777 013447 013446 060434 064116 114113 002020 027305  ...'.&a.hN.K....
73100:070227 060374 064116 017264 063300 007400 114262 027246  p.`.hN..f.......
73110:064116 044372 060227 040504 017264 063066 067067 114262  hNH.`.AD..f6n7..
73120:027246 001727 001300 067565 044063 170001 060511 067647  ......ouH3..aIo.
73130:114112 060434 064116 114113 002003 027126 002020 027126  .Ja.hN.K...V...V
73140:070230 067564 006002 027437 063563 073564 102611 002400  p.ot../.gswt....
73150:114112 017364 070231 064400 074126 067436 074125 063557  .J..p.i.xVo.xUgo
73160:017226 063556 017226 060231 067404 114112 063605 067420  ..gn..`.o..Jg.o.
73170:114112 002400 117656 060231 067404 117656 063605 067420  .J....`.o...g.o.
73200:117656 060230 064116 117656 117657 002400 073564 063070  ..`.hN......wtf8
```

```
73210:070227 063072 070230 063071 070231 160230 164231 114112  p.f:p.f9p......J
73220:034230 034231 034227 027215 017465 124100 073163 073245  8.8.8....5.@vsv.
73230:040510 002021 027235 060425 114275 063245 002002 027243  AH....a...f.....
73240:060425 114275 002001 114272 127226 000013 002400 114112  a.............J
73250:063631 067254 114112 027073 073255 044516 053101 046111  g.n..J.;v.INVALI
73260:042040 040503 041505 051523 073115 003021 027246 070126  D ACCESSvM....pV
73270:005200 074125 114276 027246 064120 074133 170133 127264  ..xU....hPx[.[..
73300:073301 000006 044105 046114 047455 002404 067311 114112  v...HELLO-..n..J
73310:027073 073312 056040 002400 114112 063564 002002 027445  .;v.\ ...Jgt../%
73320:063563 073564 102611 017364 070231 067404 114112 063631  gswt....p.o..Jg.
73330:070126 067604 074125 063634 040063 160000 114272 060126  pVo.xUg.@3....`V
73340:067572 114112 063605 067606 114112 002400 117656 060231  oz.Jg.o..J....`.
73350:067404 117656 060126 067572 117656 002400 117656 017465  o...`Voz.......5
73360:117657 002400 073564 027073 073152 060063 030425 001727  ....wt.;vj`31...
73370:030411 173416 063632 070126 067417 074125 067565 044063  1...g.pVo.xUouH3
73400:160001 114272 060126 127364 073405 041510 040516 035040  ....`V..w.CHAN:
73410:030440 040503 041517 052516 052040 030040 073410 073414  1 ACCOUNT 0 w.w.
73420:073421 052111 046505 020117 047072 020040 030461 030461  w.TIME ON:  1111
73430:020040 030461 027440 030461 027440 033470 073425 002400    11/ 11/ 78w...
73440:114112 067452 063451 114112 027126 067452 063451 114112  .Jo*g).J.Vo*g).J
73450:124254 000023 073453 046117 043440 041125 051531 026040  ....w+LOG BUSY,
73460:052122 054440 040507 040511 047040 073225 002400 067641  TRY AGAIN v...o.
73470:044063 170001 002004 067634 044063 170001 127465 074131  H3....o.H3...5xY
73500:073627 077630 067646 077626 067633 063641 002004 073625  w..o..o.g...w.
73510:063634 002004 073624 002400 137625 157625 027551 037625  g...w......./i?.
73520:037624 037626 027514 037555 057555 002001 027545 073555  ?.?./L?m_m../ewm
73530:037556 057556 002001 027545 073556 037557 067561 057557  ?n_n../ewn?ooq_o
73540:002001 027545 073557 037560 137554 063627 067630 103710  ../ewo?p.lg.o...
73550:127477 137624 173625 027517 074120 000012 000032 000013  .?..../OxP......
73560:000013 000030 073432 110000 000000 073565 000000 000000  ....w.....wu....
73570:000000 000000 073573 041517 047116 042503 052040 052111  ....w{CONNECT TI
73600:046505 035040 000000 000000 073601 000032 073607 043514  ME: ...w...w.GL
73610:040504 020124 047440 041105 020117 043040 051505 051126  AD TO BE OF SERV
73620:044503 042454 020102 054505 073636 073643 000000 000000  ICE, BYEw.w.....
73630:075121 000016 000020 000074 073634 000001 000000 000000  zQ.....<w.......
73640:000000 073641 000012 000000 000000 000000 177777 073650  ..w...........w.
73650:006412 047101 046505 026511 027104 027040 074704 074665  ..NAME-I.D. y.y.
73660:075354 102511 010443 053761 127660 106611 103711 127660  z..I.#W.........
73670:075312 106611 102611 103711 127670 000000 102500 010443  z...........@.#
73700:053761 127675 106600 103710 127675 000000 106600 102600  W...............
73710:103700 127705 000000 102500 010443 053761 127712 106600  .......@.#W.....
73720:103700 127712 000000 106600 102600 103700 127722 000000  ................
73730:102500 010443 053761 127727 106600 103700 127727 000000  .@.#W...........
73740:106600 102600 103700 127737 000000 102511 010443 053761  ...........I.#W.
73750:127744 106611 103711 127744 000000 106611 102611 103711  ................
73760:127754 000015 073763 030461 030461 000000 000000 000000  ....w.1111......
73770:000000 000000 000000 000000 000000 000000 000000 000000  ................
74000:016122 002400 067066 006020 026040 006002 026071 026053  .R..n6.., ..,9,+
74010:062120 002002 026077 003400 073066 006400 063175 002003  dP..,?..v6..f}..
74020:026036 077175 050536 026030 050500 026035 063177 026036  ,.~}Q^,.Q@,.f,.
74030:003400 043053 073071 016223 126704 016665 000000 002400  ..F+v9..........
74040:073066 073071 067203 077067 067052 077070 167067 047046  v6v9n.~7n*~8.7N&
74050:160001 002002 026150 037071 037067 037070 026046 063563  ....,h>9>7>8,&gs
74060:073066 073067 063052 073070 002400 073071 163067 002002  v6v7f*v8..v9.7..
74070:026213 037067 037071 037070 026066 016122 026010 064063  ,.>7>9>8,6.R,.h3
74100:006003 026105 047075 164001 016251 002400 072120 070126  ..,EN=....tPpV
74110:070063 062121 070125 162116 116117 026013 073560 073226  p3dQpU.N.O,.wpv.
74120:000000 073432 074076 060503 073047 002404 073050 063100  ..w.x>aCv'..v(f@
74130:073051 163051 002002 026141 037050 037051 037047 026131  v).)..,a>(>)>',Y
74140:126122 006400 177051 067076 047050 164001 114001 026134  .R...)n>N(....,\
74150:073074 016223 002400 170001 063563 043071 160000 002020  v<......gsF9....
74160:114110 063074 050500 026203 050477 026203 050536 026207  .Hf<Q@,.Q?,.Q^,.
74170:044373 160001 002003 026201 063106 043071 002004 160000  H......,fFF9....
74200:026203 044500 160001 067061 047071 164001 124001 067054  ,.I@..n1N9....n,
74210:047071 164001 124001 073074 050500 026071 016223 063074  N9....v<Q@,9..f<
74220:002007 114110 124107 074152 076250 063071 002004 050063  ...H.Gxj|.f9..P3
74230:126223 060063 002003 026240 067075 044063 164001 016251  ..`3..,.n=H3...
74240:063071 002004 070063 043075 160000 016256 066250 126223  f9..p3F=....l...
74250:075121 067310 060064 016263 000127 126251 000000 064064  zQn.`4...W....h4
74260:016263 000127 126256 074255 072300 162263 003004 072301  ...W..x.t.....t.
74270:162300 170001 006004 036300 036301 026270 036263 126263  ......<.<.,.<...
74300:000240 000000 074432 062312 043077 160000 067076 047077  ....y.d.F?..n>N?
74310:170001 126302 074312 074476 074533 074570 074625 000000  ....x.y>y[yxy...
```

```
74320:103100 072353 076354 102504 072355 062356 032355 072330  .@t.|..Dt.d.4.t.
74330:000000 066357 006004 160001 052355 002001 026332 062357  ..l.....T...,.d.
74340:003004 040001 007400 152364 064500 043564 174000 062353  ..@.....i@Gt..d.
74350:066354 102100 126317 000000 000000 000000 106700 074357  l..@..........x.
74360:000011 000000 000000 000000 072533 002023 072402 076403  ........u[..u.}.
74370:007400 047563 044063 170001 002003 026377 016404 062402  ..OsH3....,...e.
74400:066403 126365 000000 013524 074377 062422 067076 044063  m......Tx.e.n>H3
74410:170001 067226 003400 043203 040063 160000 040371 030536  ..n...F.@3..@.1^
74420:114000 126404 074317 002130 073122 077114 060063 073211  ....x..XvR~L`3v.
74430:073077 016302 016745 002400 073223 017244 016756 002400  v?......v.......
74440:073211 026000 002056 073122 077114 060063 073211 073077  v.,...vR~L`3v.v?
74450:016745 002400 073223 016302 017255 026436 000000 062456  ....v.....-...e.
74460:072442 060063 073211 073077 016745 060434 073220 064116  u"`3v.v?..a.v.hN
74470:007004 077223 064116 044415 077212 026453 074135 072516  ..~.hNI.~.-+x]uN
74500:063211 002002 026514 003400 073211 017012 002404 016737  f...-L..v.......
74510:002400 073211 062516 126476 037101 026512 000000 000000  ..v.eN.>>A-J....
74520:073135 077127 026426 000000 073135 077127 026445 000000  v]~W-...v]~W-%..
74530:062527 072523 026461 000000 072553 063211 002002 026551  eWuS-1..ukf...-i
74540:003400 073211 017012 060371 016737 002400 073211 062553  ..v...`.....v.ek
74550:126533 037102 026547 000000 000000 073150 077142 026426  .[>B-g...vh~b-.
74560:000000 073150 077142 026445 000000 062564 072560 026461  ..vh~b-%..etup-1
74570:000000 072610 063211 002002 026606 003400 073211 017012  ..u.f...-...v...
74600:060372 016737 002400 073211 062610 126570 037103 026604  `.....v.e..x>C-.
74610:000000 000000 073163 077155 026426 000000 073163 077155  ....vs~m-...vs~m
74620:026445 000000 062621 072615 026461 000000 072645 063211  -%..e.u.-1..u.f.
74630:002002 026643 003400 073211 017012 060373 016737 002400  ..-...v...`.....
74640:073211 062645 126625 037104 026641 000000 075331 106711  v.e...>D-...z...
74650:126646 000000 106700 126651 000000 106700 126654 000000  ...............
74660:106700 126657 000000 106711 126662 073205 126665 060374  ..........v...`.
74670:067231 073176 077170 063046 073211 073077 016745 017255  n.v~~xf&v.v?....
74700:016756 002400 073211 126665 073204 126704 073176 077170  ....v...v~..v~~x
74710:060063 073053 063046 073211 073077 026432 000000 072736  `3v+f&v.v?-...u.
74720:063211 002002 026734 003400 073211 017012 063046 016737  f...-...v...f&..
74730:002400 073211 062736 126716 037105 026732 000000 074510  ..v.e...>E-...yH
74740:073077 016745 017263 016756 126737 074742 003400 043203  v?........y...F.
74750:043077 160000 067225 016774 000013 126745 074744 007400  F?..n.......y...
74760:047203 047077 164001 063225 016774 000013 103101 063045  N.N?..f......Af%
74770:000036 102101 067044 126756 074766 073042 162774 003007  ...An$..y.v"....
75000:027010 073043 163042 170001 006004 037042 037043 027002  ..v#.".....>">#..
75010:036774 126774 074506 077044 001520 102201 002004 073045  =...yF~$.P....v%
75020:127012 002141 003400 043203 040063 160000 040400 006400  ...a..F.@3..A...
75030:174000 127021 002053 003400 043203 040063 160000 040400  .....+..F.@3..A.
75040:170000 127032 075225 000000 075121 077776 000005 000000  ....z...zQ.....
75050:000006 075106 177777 000000 075055 174423 174517 174554  ..zF....z-...O.l
75060:174611 075062 174442 174523 174560 174615 000000 075204  ..z2.".S.p....z.
75070:177777 000000 072364 072651 100000 000070 000030 000001  ....t.u....8....
75100:075101 000000 000000 000000 000000 000000 075106 000000  zA.........zF..
75110:000000 000000 000000 000000 075527 000000 073660 073670  ........{W..w.w.
75120:130000 000000 177774 000004 074646 000000 075126 000000  .........y...zV..
75130:000000 073675 073705 000000 000000 000000 000000 074651  ..w.w.........y.
75140:000000 000001 000000 000000 073712 073722 000000 000000  ........w.w....
75150:000000 000000 074654 000000 000001 000000 000000 073727  ....y.........w.
75160:073737 000000 000000 000000 000000 074657 000000 000001  w.........y.....
75170:000000 000000 073744 073754 000000 000000 000000 000000  ....w.w........
75200:074662 000000 000001 075204 075114 075127 075142 075155  y.....z.zLzWzbzm
75210:075170 000000 075527 000000 073660 073670 130000 100000  zx..{W..w.w.....
75220:177774 000004 074646 000000 075126 075212 160001 130000  ....y...zVz.....
75230:072713 073763 075246 017343 002400 073217 073221 063220  u.w.z.....v.v.f.
75240:002021 003004 073213 127232 074436 017232 067212 006003  ....v...y...n...
75250:073220 063227 073216 017263 127244 074455 017232 067226  v.f.v.....y-..n.
75260:077216 117214 127255 074743 067216 004010 027353 063214  ~.....y.n.....f.
75270:002004 160000 073273 102511 010443 050443 027300 027332  ....v..I.#Q#....
75300:063213 002021 027313 067212 006003 027501 017547 030444  f.....n.../A.g1$
75310:067216 117215 127263 063220 002020 027326 060502 067524  n.....f.....aBoT
75320:073220 073213 077212 002400 073221 027306 060536 073217  v.v.~...v...a^v.
75330:117222 127263 063224 002002 027300 017343 063564 043077  ....f.......gtF?
75340:064500 174000 027300 075234 063215 002004 160000 073351  i@....z.f.....v.
75350:064443 106611 127343 117214 053527 027377 067213 006021  i#......WW..n...
75360:027376 002003 027512 050400 127263 050443 127263 053531  ..../JQ...Q#..WY
75370:027444 050405 027444 053530 027460 017532 127263 067213  /$Q./$WX/0.Z..n.
75400:002404 006020 027405 004010 003400 073217 067223 006003  ..../.....v.n...
75410:027442 006020 007004 077223 063221 002003 027456 002004  /"....~.f.../...
75420:000065 073427 003045 002004 043212 073212 016774 000000  .5w..%..F.v.....
```

```
75430:063221 067106 047077 170001 063217 073224 017255 063224 f.nFN?..f.v...f.
75440:073217 127263 117222 127263 060500 067223 006003 027405 v.......a@n.../.
75450:063221 002004 001100 003004 043212 073212 017255 127263 f....@..F.v.....
75460:067221 006003 127263 003400 044000 077221 043213 073213 n.......H.~.F.v.
75470:006011 127263 003400 043212 073212 163212 010527 173212 ......F.v....W..
75500:127263 067220 006003 027313 067216 002400 117215 037213 ..n....n.....>.
75510:127263 127263 063223 002003 127263 002020 127263 002400 ....f..........
75520:073221 073223 002404 027405 075525 006412 177777 000015 v.v.../.{U......
75530:000137 000176 075376 067221 006011 001737 133212 173212 ._.~z.n.........
75540:006014 037212 077221 037213 127532 037213 127532 075307 ..>.~.>..Z>..Zz.
75550:067221 163212 006011 001727 010443 006014 037212 077221 n........#..>.~.
75560:037213 127547 127547 000065 000064 000000 103100 102204 >..g.g.5.4...@..
75570:027604 073647 077650 001520 102201 002004 073651 063565 /.w...P....w.gu
75600:073652 106704 102004 027604 103101 063651 000036 102101 w...../..Ag....A
75610:064443 106611 106611 000000 000000 000000 067120 106611 i#.........nP..
75620:067133 000000 067146 000000 067161 000000 067174 106611 n[..nf..nq..n|..
75630:060373 102610 063647 067650 103711 103711 000000 000000 `...g.o.........
75640:000000 000000 000000 103710 102704 102100 127652 000000 ...........@....
75650:000000 000000 000000 000000 000000 000000 000000 000000 ................
75660:000000 000000 000000 000000 000000 000000 000000 000000 ................
75670:000000 000000 000000 000000 000000 000000 000000 000000 ................
75700:163705 053706 127705 127704 073313 077000 105734 000000 ..W.....v.~.....
75710:000000 000000 000000 000000 000000 000000 000000 000000 ................
75720:106700 127722 067314 000000 000000 000000 000000 000000 ....n...........
75730:000000 000000 000000 000000 000000 000000 000000 000000 ................
75740:000000 000000 000000 000000 000000 000000 000000 000000 ................
75750:000000 000000 000000 000000 000000 000000 000000 000000 ................
75760:000000 000000 000000 000000 000000 000000 000000 000000 ................
75770:000000 000000 000000 000000 000000 000000 000000 000000 ................

[end of 31KW memory, remaining spillover removed]
----------------------------------------------------------------
```

If needed the UNSHAM word in the "utility" build (in msubasic.zip) can decode the dump text back into a binary, might be a handy way to embed HP binaries in text files and documents. When copying dump text from a PDF file I found that spaces were turned into 2-byte codes that merely looked like spaces in a modern editor, had to program the decoder so if it didn't see spaces separating the data elements it compensated by incrementing the string pointer.

Going further...

The present version seems to be solid, the patches implement the essential features needed to make it possible to save and reload BASIC programs in a HP-IPL/OS environment without preventing stand-alone use, and enhances stand-alone operation by permitting binaries to be punched with an embedded BASIC program. There are still a few things that could be done...

Make a stand-alone save routine that can punch an ABS binary to PTP without requiring HP-IPL/OS and a 64KW MX-class mini. There's almost 1KW available so might be able to handle slot patching and changing the info line, a handy way to identify embedded BASIC programs.

Come up with a better way to change the info lines that can change the number of lines and doesn't rely on having to space-pad the lines during configuration... maybe.. doing so won't exactly be easy since that section appears before the program, would have to find new empty space to put added lines. No pressing need, what I've got works just could use more error-checking to avoid corrupting the binary.

Figure out what's causing the configuration text glitch. Not necessarily fix it (unless fixing it doesn't shift memory), just satisfy myself that something isn't being improperly configured as a result.

Links and stuff...

Tim Riker's MSU BASIC wiki site - http://rikers.org/wiki/MsuBasic
Patched 31KW MSU BASIC web page - http://newton.freehostia.com/hp/msubasic.html
IDE disk, PTR emulator, and HP21xx software - http://newton.freehostia.com/hp/
HP-IPL/OS main page - http://www.infionline.net/~wtnewton/oldcomp/hp2100/
HP-IPL/OS testing page - http://www.infionline.net/~wtnewton/hpiplos.html
SimH simulators - http://simh.trailing-edge.com/

MSU BASIC comes from the Montana State University and was reported to be included in HP's
Library of Contributed User Software (LOCUS) as items 22255-60001 and 60002 (from a discussion
appearing on the ClassicCmp "cctech" mailing list, March 2005). It also has been distributed as items
22255-80001 through 80017, this is the "RevA" source dated late 1971 used for the "nolog"
modification, from which this 31KW version was derived. The following was extracted from the March
1977 LOCUS catalog obtained from http://www.bitsavers.org/ (VT100 mirror) under hp/21xx/locus/

```
CONTRIBUTION #:  191                    PART NUMBER: 22255E-K01
CLASS: 18                                       PRICE: $170
CONTRIBUTOR:  N. K. SHRAUGER               DATE CODE:
              MONTANA STATE UNIVERSITY     LANG: ASSEMBLY ABSOLUTE
                                           OP SYS: SELF CONTAINED

MSU MULTI-TERMINAL HP BASIC SYSTEM WITH CARD READER CAPABILITY

    THIS MULTI-TERMINAL HP BASIC SYSTEM WITH CARD READER CAPABILITY
    IS AN EXPANDABLE LOW COST (TIME-SHARE) SYSTEM REQUIRING AN HP2116B
    COMPUTER WITH 16K, TWO TO FIVE TELEPRINTERS WITH INTERFACE, AND
    TIME BASE GENERATOR.  THE OPTIONAL CARD READER (HP2761-007 MARK
    SENSE CARD READER FOR EDUCATIONAL BASIC) CAN BE USED FOR INPUT ON
    ONE OF THE FOUR USER PORTS.  THE SYSTEM PROVIDES 8500 WORDS OF
    MEMORY WHICH CAN BE DIVIDED AMONG THE FOUR USERS, AUTOMATIC
    LOGGING AND ACCOUNTING OF USERS FOR UNATTENDED OPERATION, AND A
    MESSAGE COMMAND FOR SIGNALLING THE COMPUTER OPERATOR.  USER CODE
    WORDS FOR SIGN-ON PREVENT UNAUTHORIZED USE.  A RENUMBER COMMAND
    RESEQUENCES STATEMENTS, A PTAPE COMMAND LOADS USER-DEVELOPED OR

2-86
    SYSTEM LIBRARY PROGRAMS FROM THE PHOTOREADER, CALL AND WAIT
    STATEMENTS ARE DELETED, AND ALL OTHER USER COMMANDS ARE IDENTICAL
    TO THOSE OF HP SINGLE TERMINAL BASIC, 20392.

    EXTENDED DOCUMENTATION - ORDER #22255E-D00    $15.00
```

The cost of $170 correlates with the media cost of 17 paper tapes, the introduction states: "The large
variety of programs can be used without modification or as a starting point for developing special
purpose software." Contributers were compensated by a "traditional plaque engraved with his/her
name, and the choice of any other contributed program of equal dollar value."

- - - - - - -

Terry Newton <wtnewton@infionline.net>
Last modified March 8 2008.