week 1

soundcloud.com/cs50


when clicked
say hello, world!


say
hello, world!

statements

functions


repeat
10

loops


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mouse down?

Boolean expressions


if

conditions

conditions


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sectioning

this Wed through Fri

supersections

week 2

sections

week 3 onward

heads@cs50.harvard.edu

problem set 0

office hours

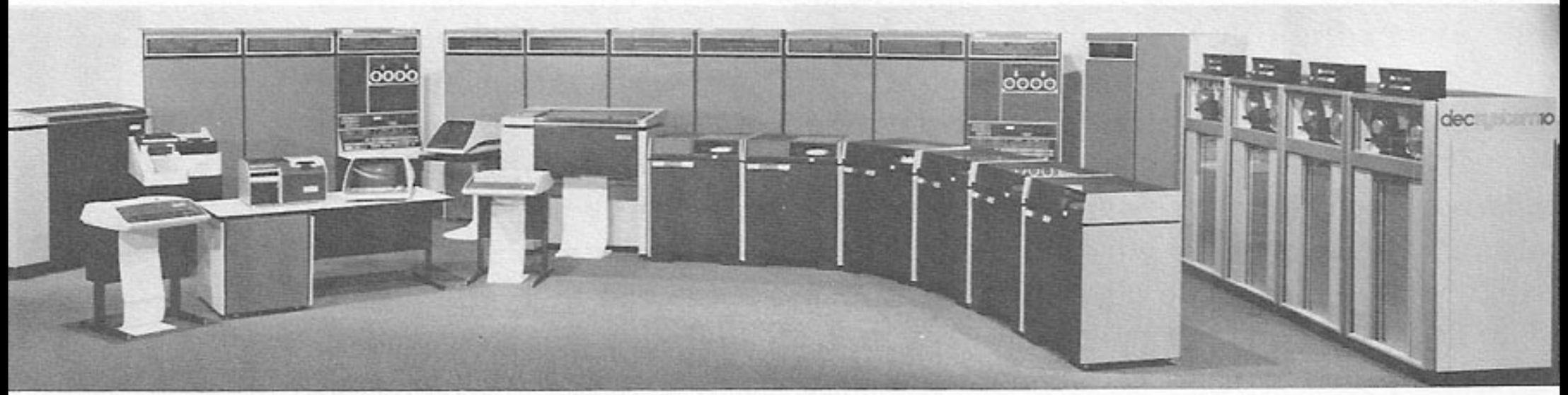
cs50.harvard.edu/hours

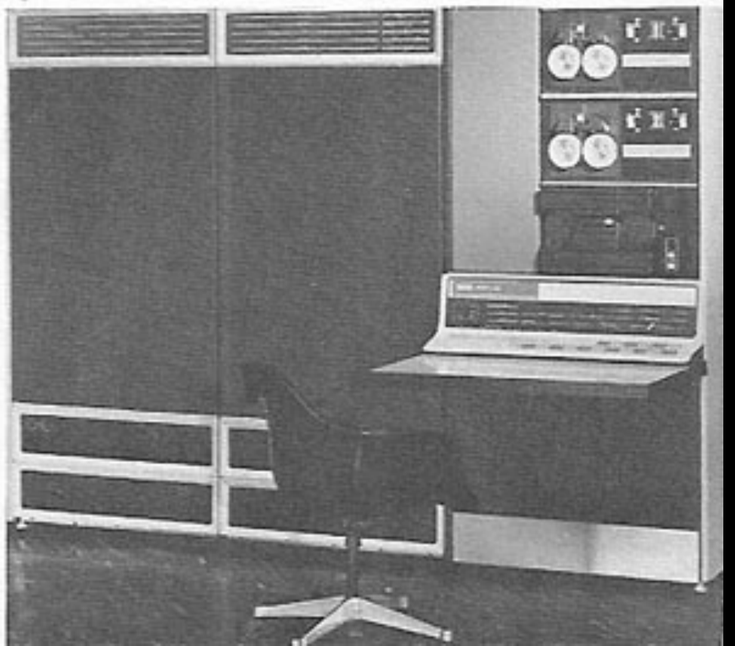
twitter.com/HarvardSquare

forbes.com

seattleducation2010.wordpress.com

THE PDP-10 FAMILY





HOW TO "READ" FM TUNER SPECIFICATIONS

Popular Electronics

WORLD'S LARGEST-SELLING ELECTRONICS MAGAZINE JANUARY 1975/75¢

PROJECT BREAKTHROUGH!

World's First Minicomputer Kit to Rival Commercial Models...

"ALTAIR 8800" SAVE OVER $1000

ALSO IN THIS ISSUE:

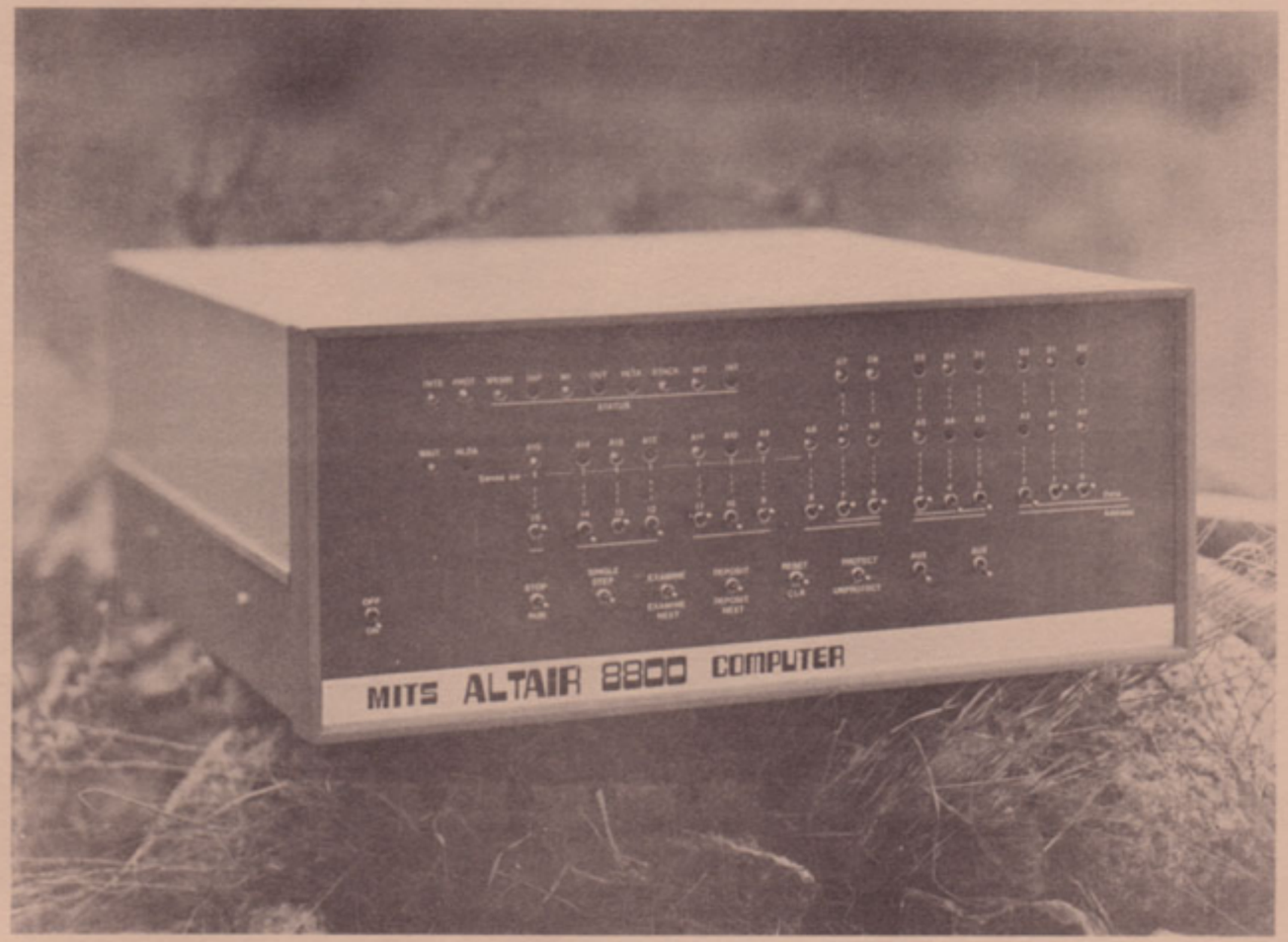
- An Under-$90 Scientific Calculator Project
- CCD's—TV Camera Tube Successor?
- Thyristor-Controlled Photoflashers

TEST REPORTS:

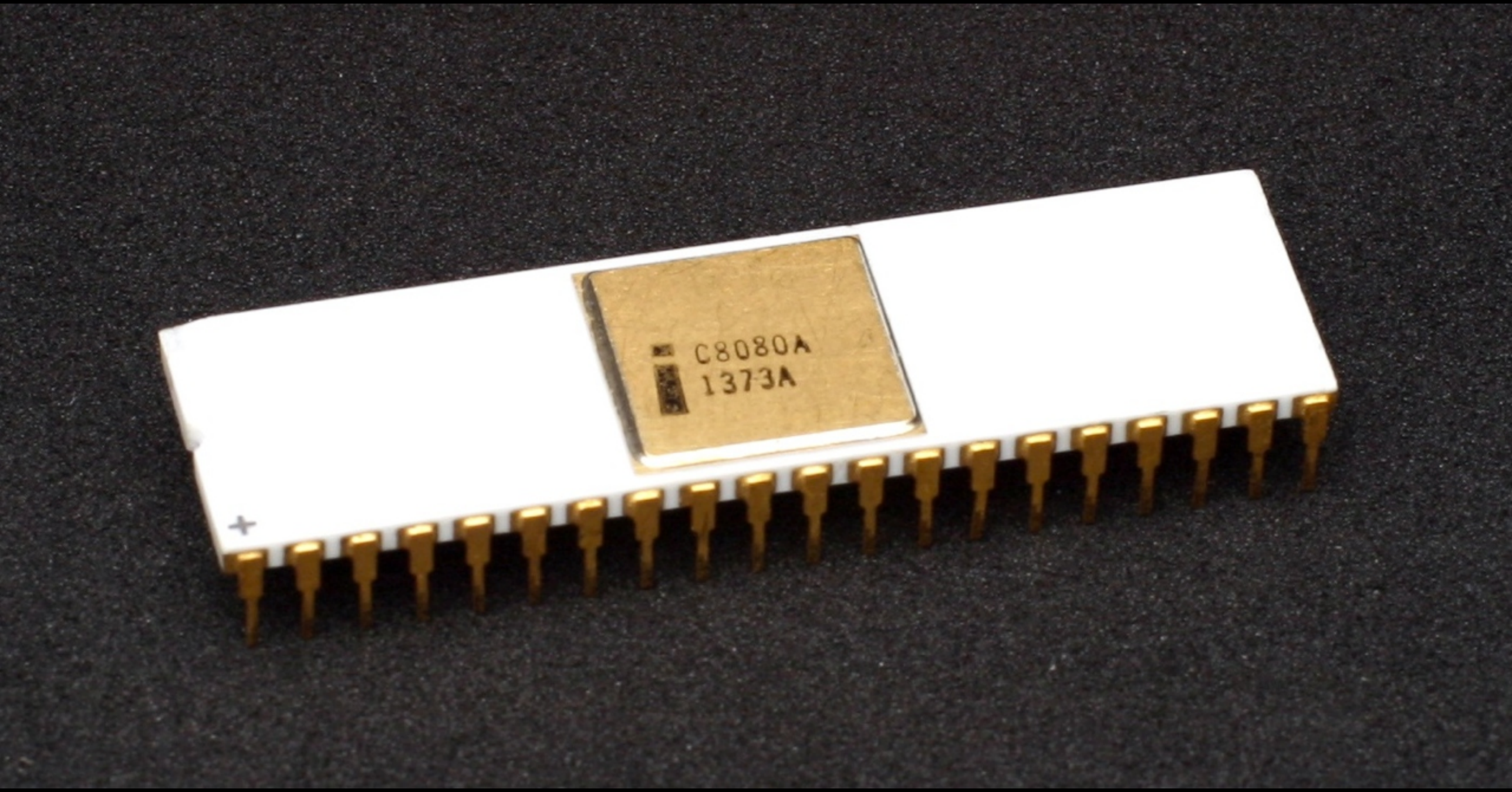
Technics 200 Speaker System
Pioneer RT-1011 Open-Reel Recorder
Tram Diamond-40 CB AM Transceiver
Edmund Scientific "Kirlian" Photo Kit
Hewlett-Packard 5381 Frequency Counter

MITS ALTAIR 8800

COMPUTER SYSTEMS BROCHURE



A Computer Concept Becomes an exciting reality.

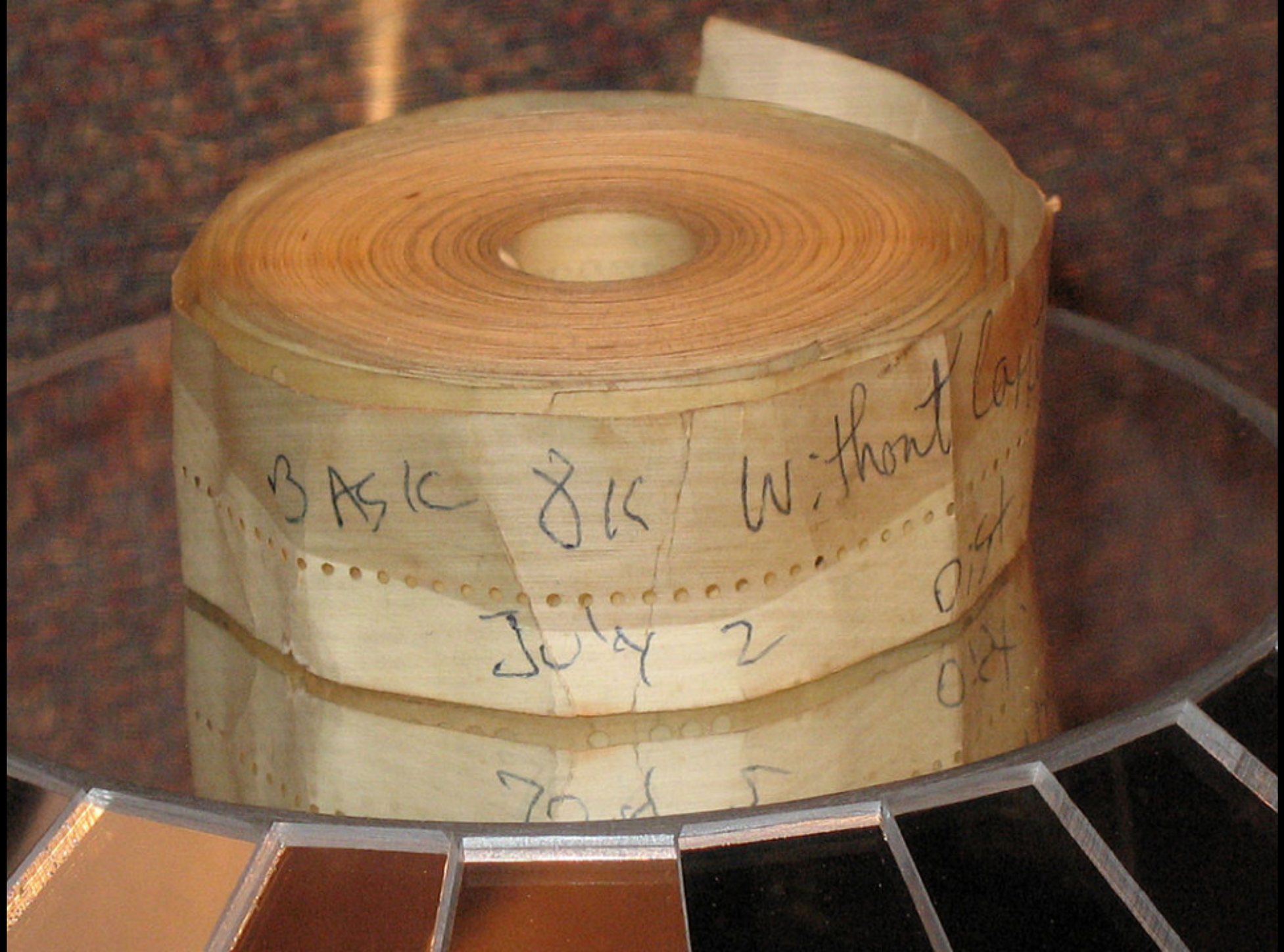


wikipedia.org

intel

MCS-80™
USER'S MANUAL
(WITH INTRODUCTION TO MCS-85™)

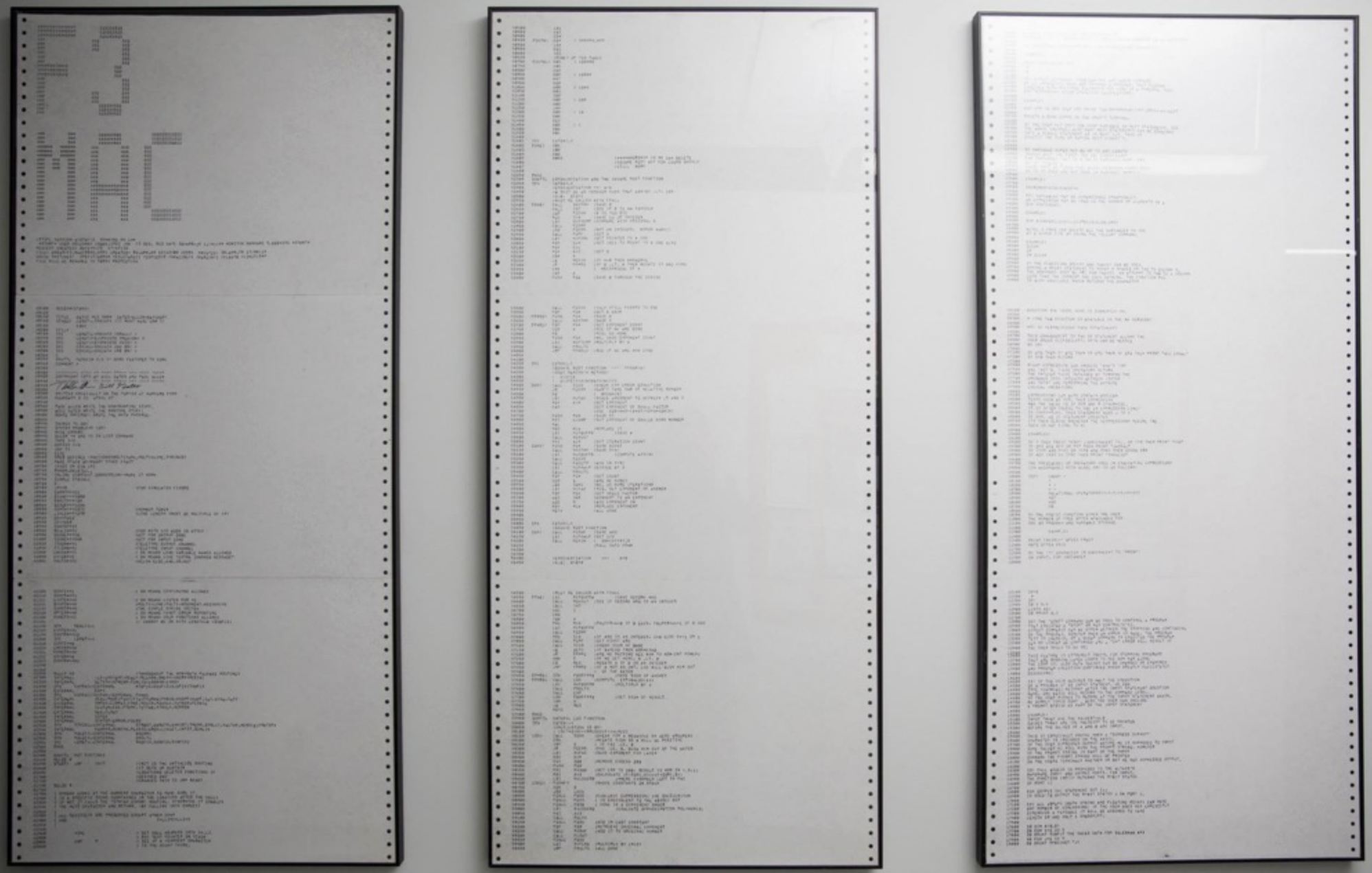
8080



medium.com/@davbunnell

MICROSOFT


seas.harvard.edu


F3
MAC

```
00320   >
00340   SUBTTL  VERSION 1.1
00360   COMMENT *
00380
00400   COPYRIGHT 1975 BY BILL GATES AND PAUL ALLEN
00420
00440
00460
00480   WRITTEN ORIGINALLY ON THE PDP-10 AT HARVARD FROM
00500   FEBRUARY 9 TO  APRIL 27
00540
00560   PAUL ALLEN WROTE THE NON-RUNTIME STUFF.
00580   BILL GATES WROTE THE RUNTIME STUFF.
00600   MONTE DAVIDOFF WROTE THE MATH PACKAGE.
00620
00640   THINGS TO DO:
00641   SYNTAX PROBLEMS (OR)
00642   NICE ERRORS
00643   ALLOW ↑W AND ↑C IN LIST COMMAND
00646   TAPE I/O
00648   BUFFER I/O
00650   USR ??
00652   ELSE
00660   USER DEFINED FUNCTIONS(MULTI-ARG,MULTI-LINE,STRINGS)
00680   MAKE STACK POINTER STUFF
```

Paul Allen Bill Gates

```
4100                    EWRI>   ;SEE IF WE ARE NOW DONE
4150
4200    IFE     EXTENS,S
4250            ;SQUARE ROOT FUNCTION  ---  X=SQR(A)
4300            ;USES NEWTON'S METHOD:
4350            ;   X(0)=A
4400            ;   X(V+1)=(X(N)+A/X(N))/2
4450    SQR:    CALL    SIGN    ;CHECK FOR ERROR CONDITION
4500            JM      FCERR   ;CAN'T TAKE SQR OF NEGATIVE NUMBER
4550                            ;  0=SQR(0)
4600            RZ              ;SCALE ARGUMENT TO BETWEEN .5 AND 2
4650            LXI     H;FAC   ;GET EXPONENT
4700            MOV     A;M     ;GET EXPONENT OF SCALE FACTOR
4750            RAR             ;USE  SQR(M*2↑(2*N))=2↑N*SQR(M)
4800                            ;SAVE IT
4850            PUSH    PSW     ;SET EXPONENT OF SCALED DOWN NUMBER
4900            MVI     A;100
4950            RAL             ;REPLACE IT
5000            MOV     M;A     ;SAVE A
5050            LXI     H;FBUFFR
5100            CALL    MOVOUT  ;SET ITERATION COUNT
5150            MVI     A;4     ;SAVE COUNT
5200            PUSH    PSW     ;SAVE X(N)
5250            CALL    MVOTMP  ;COMPUTE A/X(N)
5300            LXI     H;FBUFFR
5350    SQRI:   CALL    FDIVS
5400            CALL    FADDTM  ;ADD IN X(N)
5450            LXI     H;FHALF ;DIVIDE BY 2
5500            CALL    FMULTS  ;GET COUNT
5550                            ;DONE?
5600                            ;ITERATIONS
5650                            ;OF ANSWER
```

```
10 PRINT "hello, world"
20 END
```

code

source code

```
#include <stdio.h>

int main(void)
{
    printf("hello, world\n");
}
```

compiler

source code

↓

compiler

source code

↓

compiler

↓

object code

```
10000011 00000001 00010001 00000000 00111101 11111100 01110100 00111101
00000000 01000000 00000000 00000000 00000000 00000000 00000000 00000000
10010000 00000000 00000000 00000000 01010000 00000000 00000111 00110000
00001011 00000001 00001011 00000011 00001010 00000000 00000000 00000000
00000000 00100000 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00100000 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
01110000 00010000 00000000 00100000 00000001 00000000 00000000 00000000
00000000 00000000 00000000 00100000 00000001 00000000 00000000 00000000
00000000 00000000 00000000 01000000 00000001 00000000 00000000 00000000
00000000 00100000 00000000 01000000 00000001 00000000 00000000 00000000
11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111
10010000 10000000 00000000 01000000 00000001 00000000 00000000 00000000
00101110 01100100 01111001 01101110 01100001 01101101 01101001 01100011
10110000 00000100 00000000 00100000 00000001 00000000 00000000 00000000
10110000 00000100 00000000 00100000 00000001 00000000 00000000 00000000
10100000 00000001 00000000 00000000 00000000 00000000 00000000 00000000
10110000 00000100 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000 00000000 00100000 00000000 00000000
```

...


when clicked
say hello, world


```
int main(void)
{
    printf("hello, world\n");
}
```

functions

functions


```
printf("hello, world\n");
```

loops

loops


```
while (true)
{
    printf("hello, world\n");
}
```

loops

loops


```
for (int i = 0; i < 10; i++)
{
    printf("hello, world!\n");
}
```

variables

variables

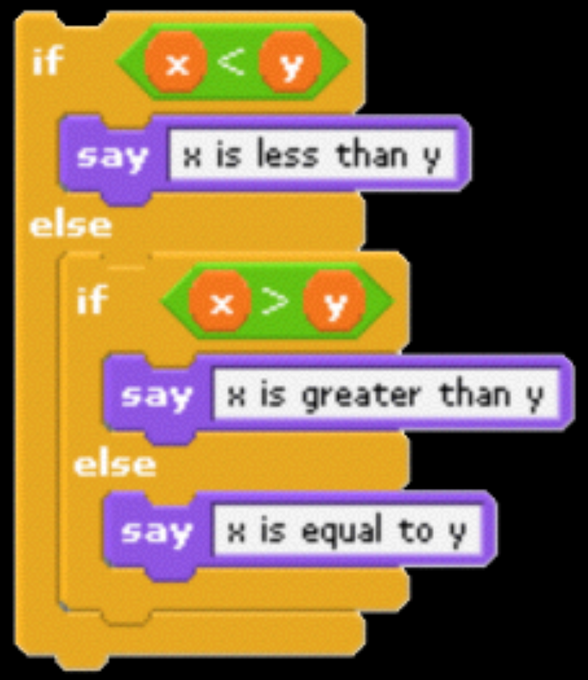

```
int counter = 0;
while (true)
{
    printf("%d\n", counter);
    counter++;
}
```

Boolean expressions

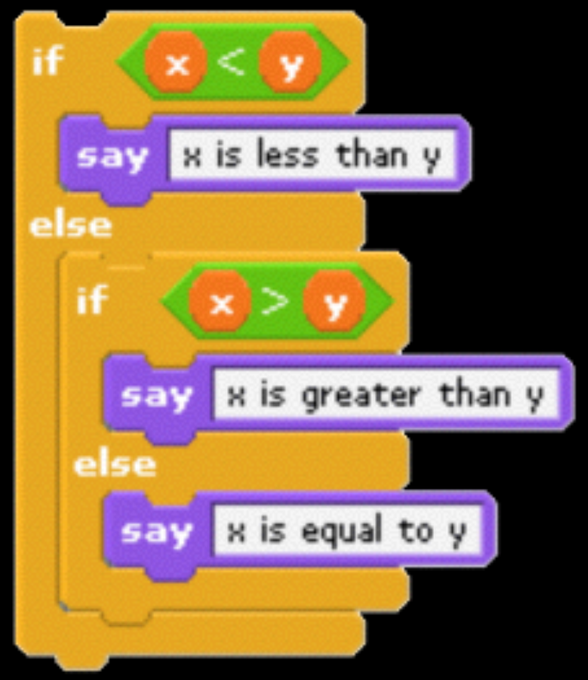
Boolean expressions


```
(x < y)
((x < y) && (y < z))
```

conditions


if x < y
say x is less than y
else
if x > y
say x is greater than y
else
say x is equal to y

conditions

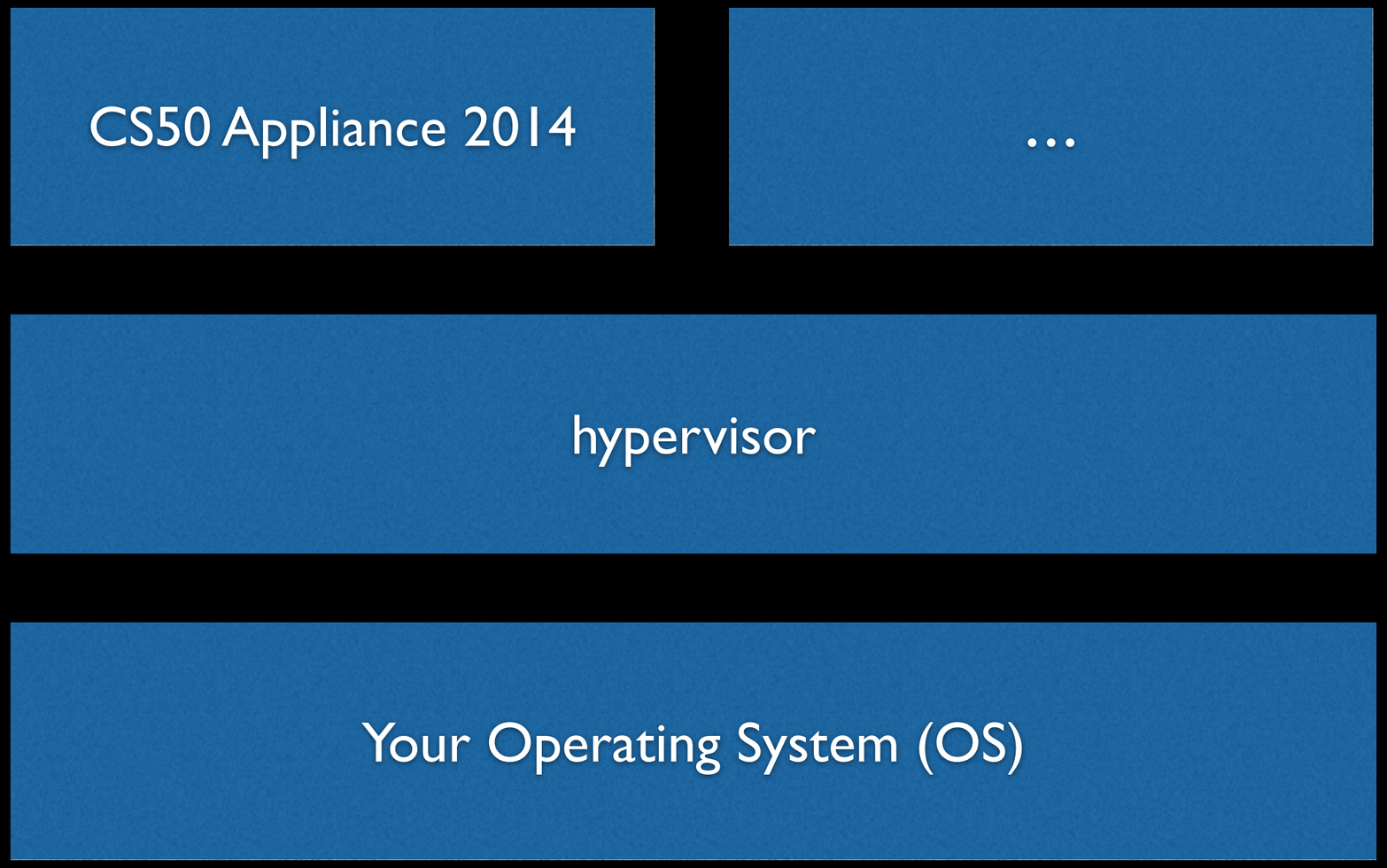



```
if (x < y)
{
    printf("x is less than y\n");
}
else if (x > y)
{
    printf("x is greater than y\n");
}
else
{
    printf("x is equal to y\n");
}
```

```
#include <stdio.h>

int main(void)
{
    printf("hello, world\n");
}
```


CS50 Appliance 2014
Trash
Home
CS50
Menu


CS50 Appliance 2014
...
hypervisor
Your Operating System (OS)

how to write a program

`gedit`

CS50 Appliance 2014

*hello.c (~) - gedit

File Edit View Search Documents Help

Source Code

Functions

main

*hello.c

```
1 #include <stdio.h>
2
3 int main(void)
4 {
5     printf("hello, world\n");
6 }
```

```
jharvard@appliance:~$
```

Terminal

C Tab Width: 4 Ln 5, Col 30 INS

Menu *hello.c (~) - gedit

how to compile a program

```
make hello
```

how to run a program

```
./hello
```

Standard Library

stdio.h

```
printf

...
```

CS50 Library

cs50.h

GetChar

GetDouble

GetFloat

GetInt

GetLongLong

GetString

types

```
char

double

float

int

long long

...
```

to be continued...