

Week 1



VS

C

programs





```
#include <stdio.h>

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

functions



A Scratch script consisting of a single green control script. It has a purple rounded rectangular hat and a white speech bubble pointing right. Inside the bubble, the word "say" is in black, and "[hello, world]" is in blue, red, green, and orange.

```
say [hello, world]
```



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

loops





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





```
for (int i = 0; i < 50; i++)  
{  
    printf("hello, world\n");  
}
```

variables





```
int i = 0;
```

Boolean expressions





$i < 50$

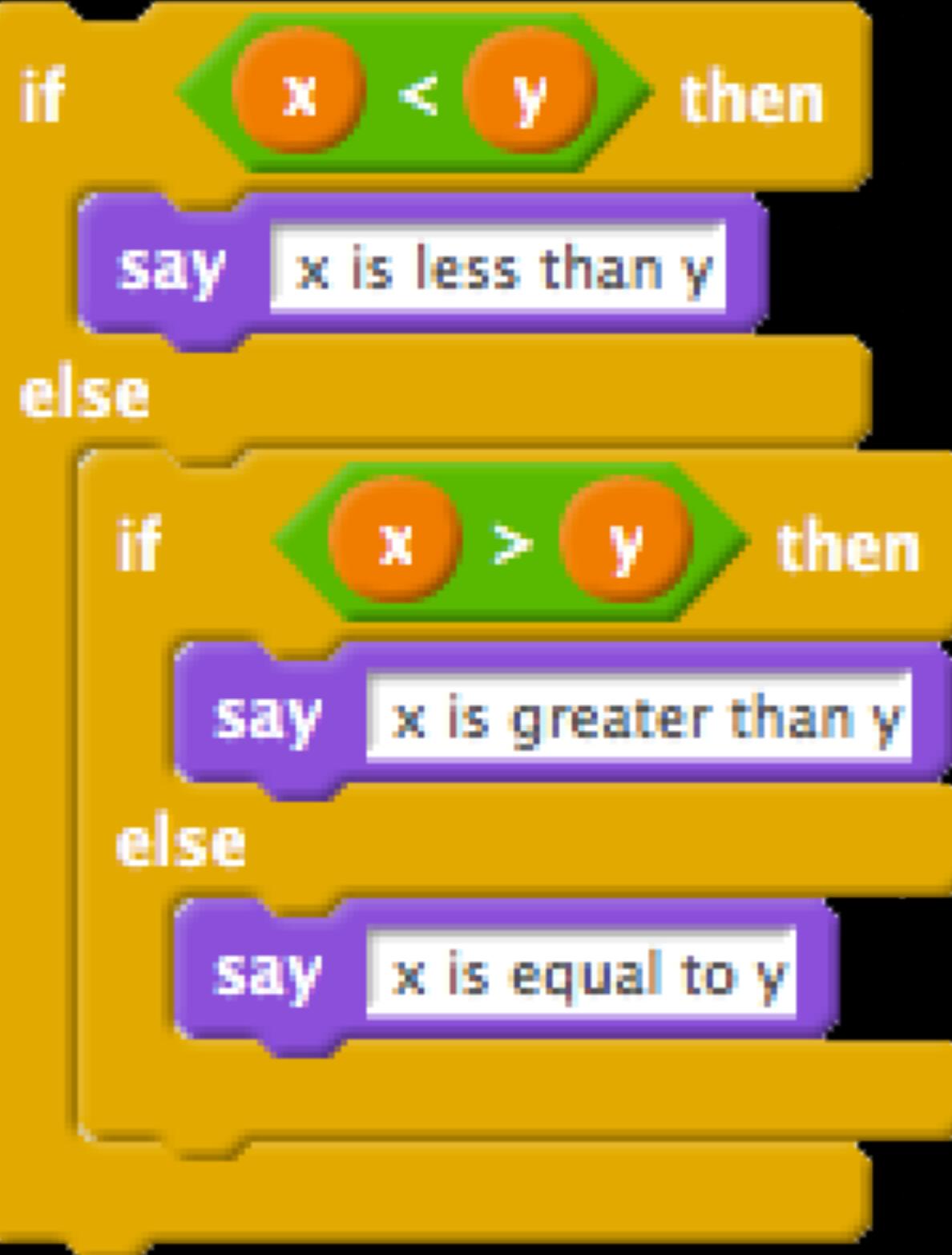




$x < y$

conditions

```
if [x < y] then  
  say [x is less than y]  
  
else  
  if [x > y] then  
    say [x is greater than y]  
  else  
    say [x is equal to y]
```



```
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");
}
```

arrays

item 1 of argv

item 1 of argv

argv[0]

source code

```
#include <stdio.h>

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

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int main(void)
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}
```

machine code

01111111	01000101	01001100	01000110	00000010	00000001	00000001	00000001	00000000
00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
00000010	00000000	00111110	00000000	00000001	00000000	00000000	00000000	00000000
10110000	00000101	01000000	00000000	00000000	00000000	00000000	00000000	00000000
01000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
11010000	00010011	00000000	00000000	00000000	00000000	00000000	00000000	00000000
00000000	00000000	00000000	00000000	01000000	00000000	00111000	00000000	00000000
00001001	00000000	01000000	00000000	00100100	00000000	00100001	00000000	00000000
00000110	00000000	00000000	00000000	00000101	00000000	00000000	00000000	00000000
01000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
01000000	00000000	01000000	00000000	00000000	00000000	00000000	00000000	00000000
01000000	00000000	01000000	00000000	00000000	00000000	00000000	00000000	00000000
11111000	00000001	00000000	00000000	00000000	00000000	00000000	00000000	00000000
11111000	00000001	00000000	00000000	00000000	00000000	00000000	00000000	00000000
00001000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
00000011	00000000	00000000	00000000	00000100	00000000	00000000	00000000	00000000
00111000	00000010	00000000	00000000	00000000	00000000	00000000	00000000	00000000
00111000	00000010	01000000	00000000	00000000	00000000	00000000	00000000	00000000
00111000	00000010	01000000	00000000	00000000	00000000	00000000	00000000	00000000
00011100	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000

...

compiler

CS50 IDE

cs50.io

The screenshot shows the CS50 IDE interface. At the top, there's a browser-like header with a red, yellow, and green button, the title "CS50 IDE", and a search bar containing "http://cs50.io/". Below the header is a menu bar with "CS50 IDE", "File", "Edit", "Find", "View", "Go", "Window", and "Support". On the right side, there's a small cartoon mouse icon and three tabs labeled "Outline", "Debugger", and "Terminal".

The main workspace contains two tabs:

- hello.c**: A C source code editor tab showing the following code:

```
1 #include <stdio.h>
2
3 int main(void)
4 {
5     printf("hello, world\n");
6 }
```
- workspace/**: A terminal tab showing the current directory as `~/workspace/`.

The terminal tab displays the prompt `~/workspace/ $`.

The screenshot shows the CS50 IDE interface. At the top, there's a browser-like header with a red, yellow, and green button, the title "CS50 IDE", and a URL field containing "http://cs50.io/". Below this is a menu bar with "CS50 IDE", "File", "Edit", "Find", "View", "Go", "Window", and "Support". To the right of the menu is a small profile picture of a person.

The main area features a dark-themed code editor. On the left, a sidebar shows a folder icon for "~/workspace" and a file icon for "hello.c". The code editor tab for "hello.c" is active, displaying the following C code:

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

To the right of the code editor are two panels: "Outline" and "Debugger".

At the bottom of the interface is a terminal window titled "workspace/". It displays the command line path " ~/workspace/ \$" followed by a cursor icon.

printf

...

clang hello.c

./a.out

```
clang -o hello hello.c
```

```
./hello
```

make hello

./hello

`cd`

`ls`

`mkdir`

`rm`

`rmdir`

`...`

`get_char`

`get_double`

`get_float`

`get_int`

`get_long_long`

`get_string`

...

bool

char

double

float

int

long long

string

...

%c

%f

%i

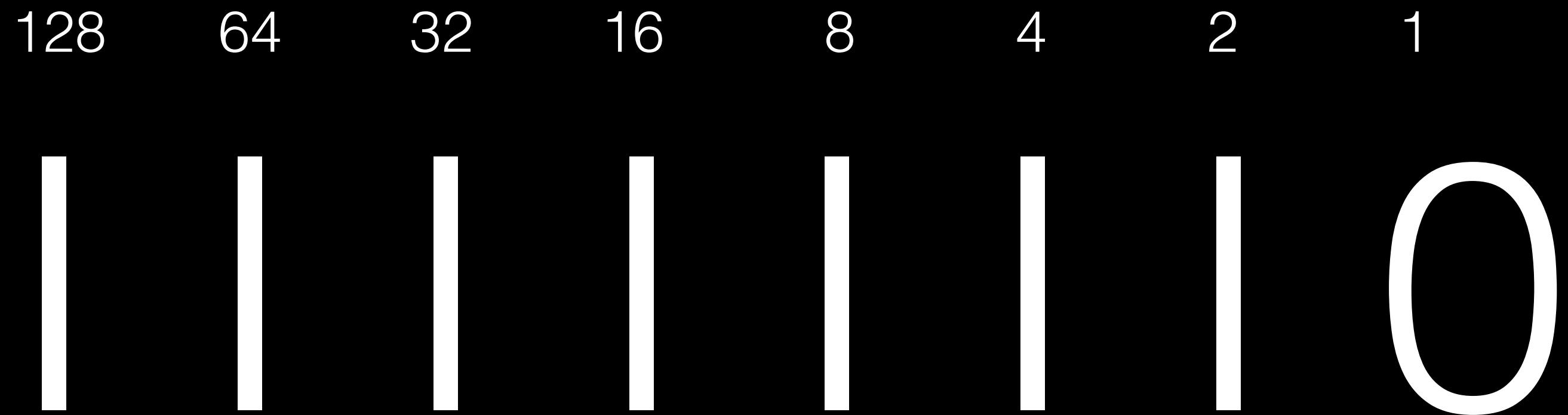
%lld

%s

...



integer overflow



128

64

32

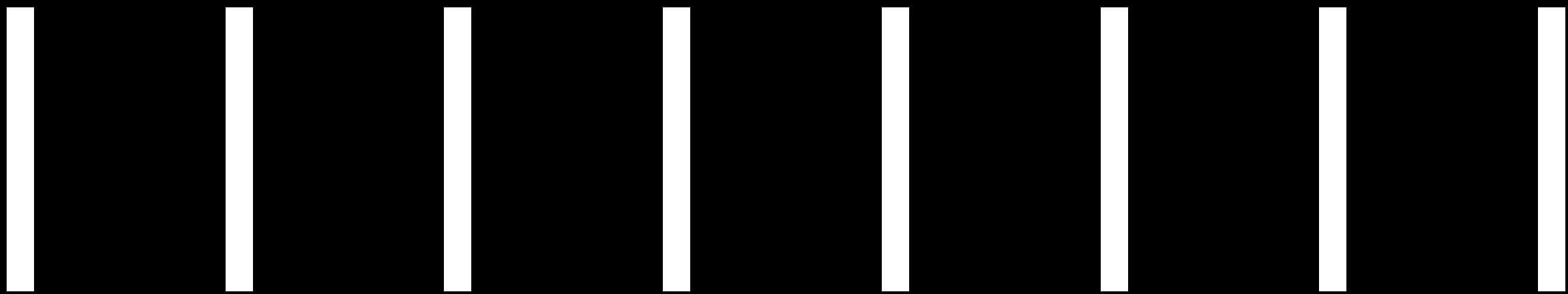
16

8

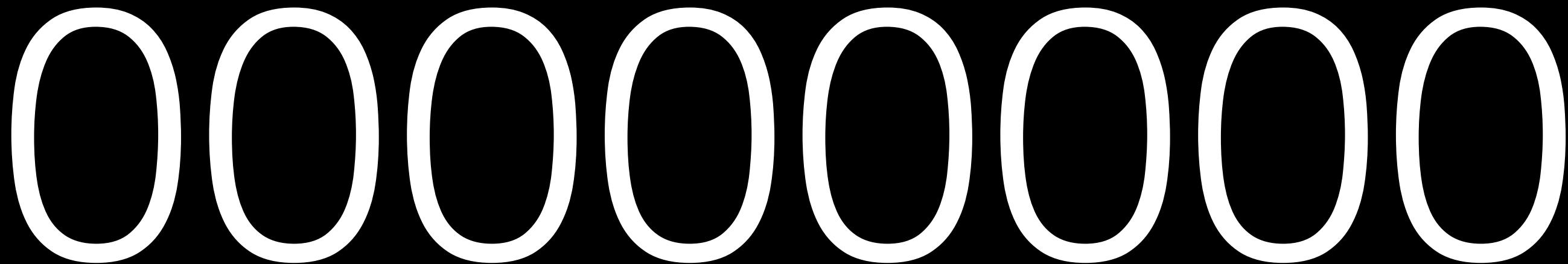
4

2

1



128 64 32 16 8 4 2 1







B **Dad's**

A **Green**

4,000,000,000





Greetings from Mr. Gandhi, ruler
and King of the Indians...
Our words are backed
with NUCLEAR WEAPONS!





floating-point imprecision

printf

...

`get_char`

`get_double`

`get_float`

`get_int`

`get_long_long`

`get_string`

...

bool

char

double

float

int

long long

string

...

`%c`

`%f`

`%i`

`%lld`

`%lu`

`%s`

`...`

if

else

switch

for

while

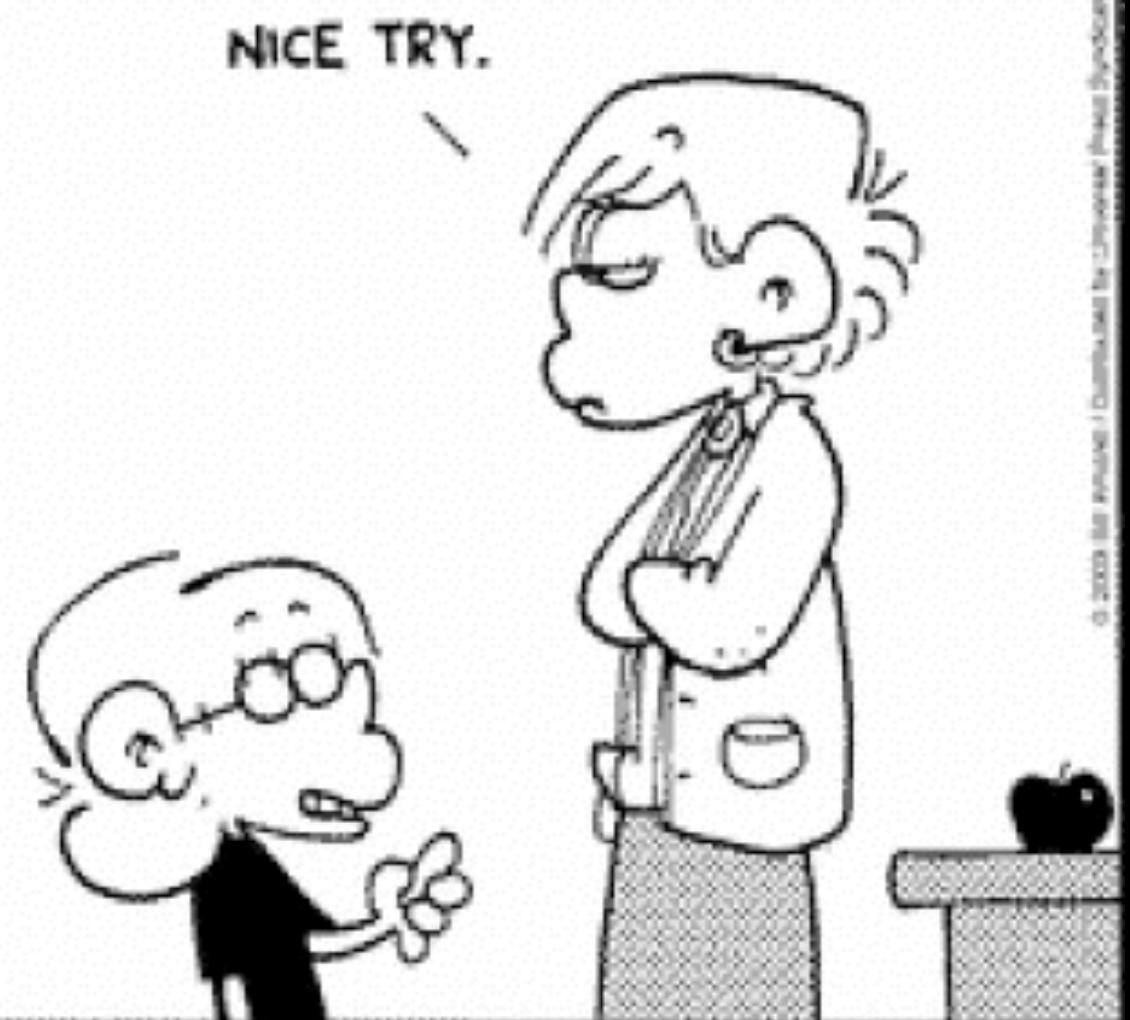
do . . . while

...

scope

```
#include <stdio.h>
int main(void)
{
    int count;
    for(count = 1; count <= 500; count++)
        printf("I will not throw paper airplanes in class.");
    return 0;
}
```

AMEND 10-3



abstraction

make hello

preprocessing

compiling

assembling

linking





VS

C

C