Week 1

VS

C

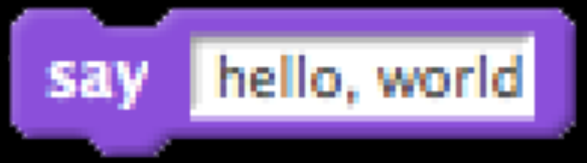
programs

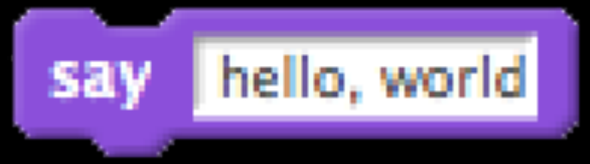
when clicked
say hello, world

```c
#include <stdio.h>

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

functions


say
hello, world




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

loops

forever
say
hello, world

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

repeat 50
say hello, world

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

variables

set i to 0

```
int i = 0;
```

Boolean expressions

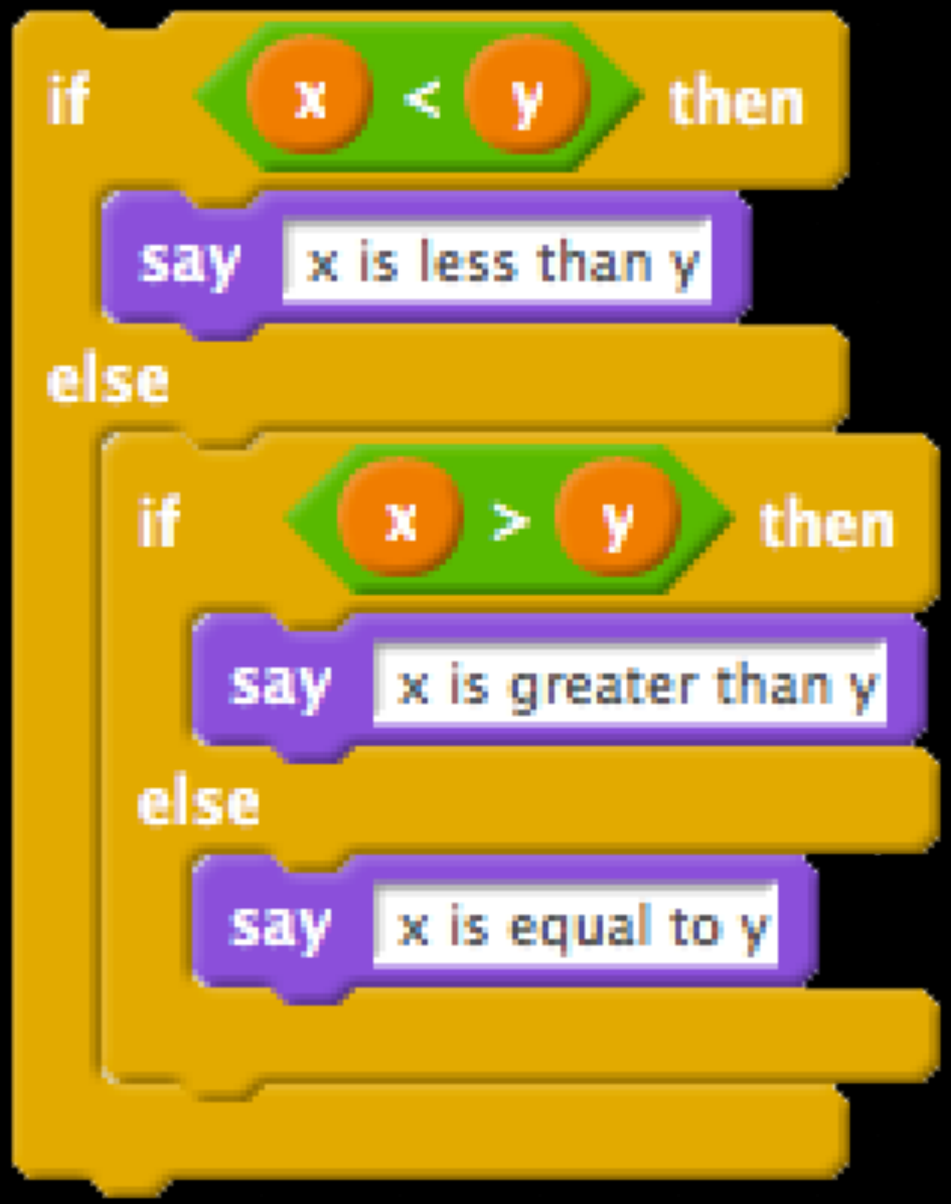
i
<
50

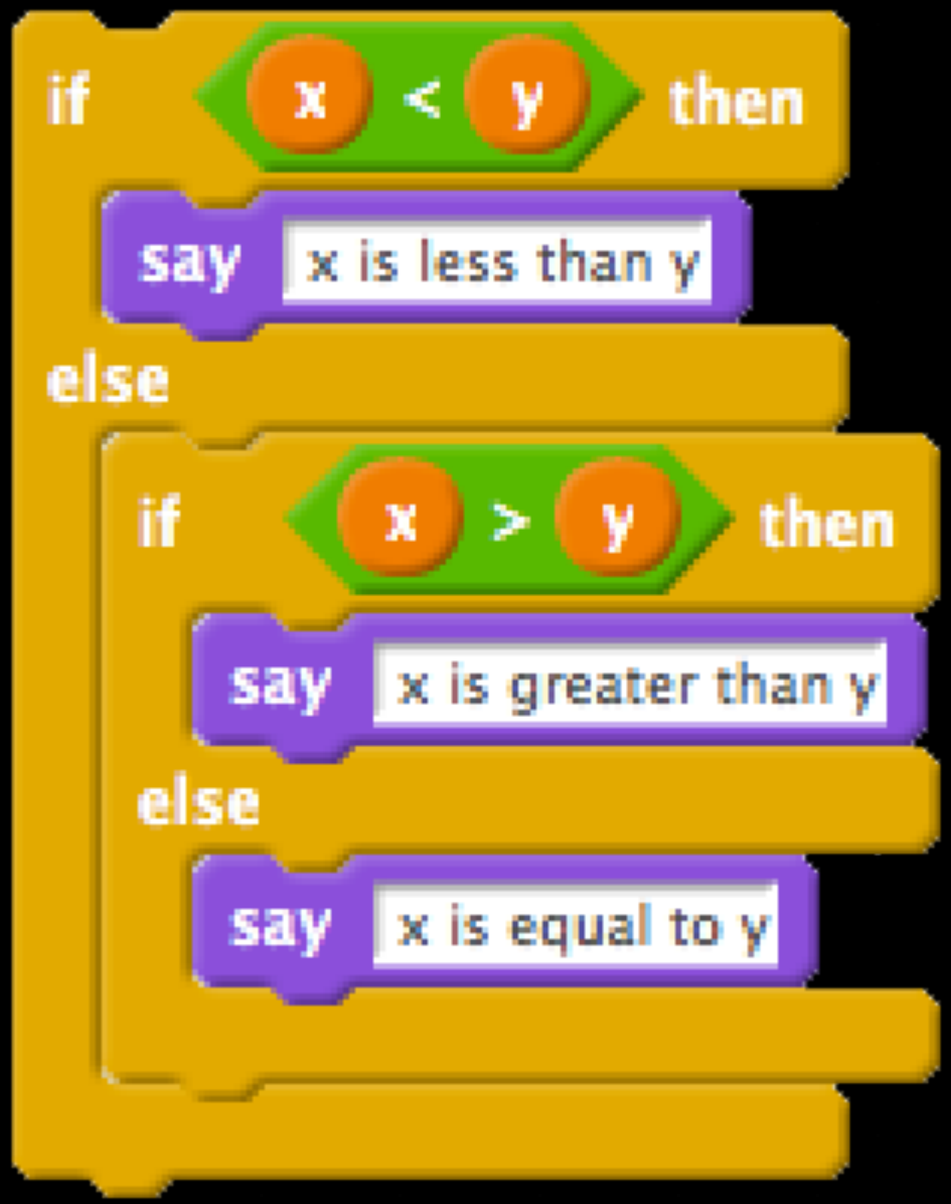
```
i < 50
```

x
<
y

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

argv[0]

source code

```c
#include <stdio.h>

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

```c
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int main(void)
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#include <stdio.h>

int main(void)
{
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}
```

machine code

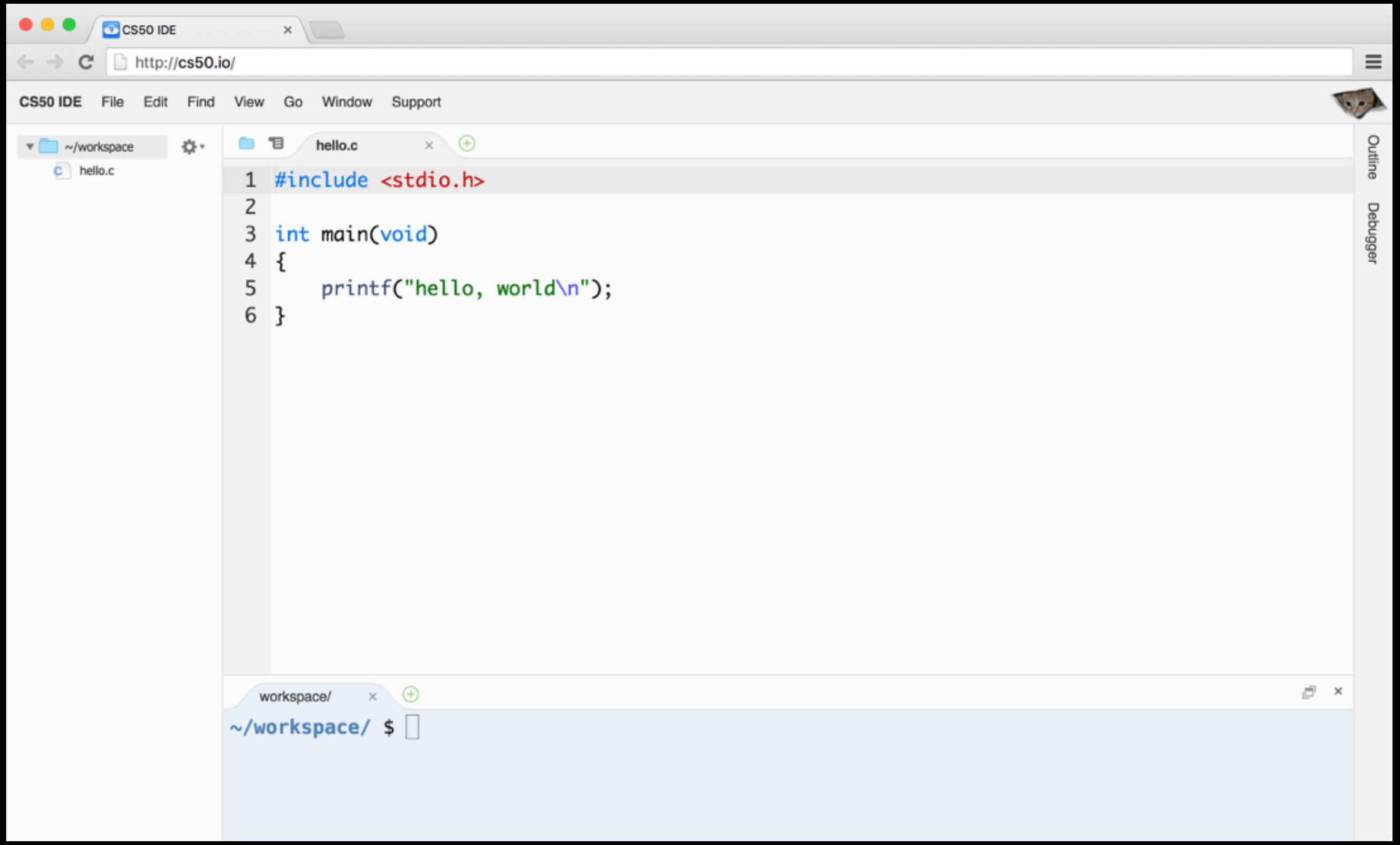
```
01111111 01000101 01001100 01000110 00000010 00000001 00000001 00000000
00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
00000010 00000000 00111110 00000000 00000001 00000000 00000000 00000000
10110000 00000101 01000000 00000000 00000000 00000000 00000000 00000000
01000000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

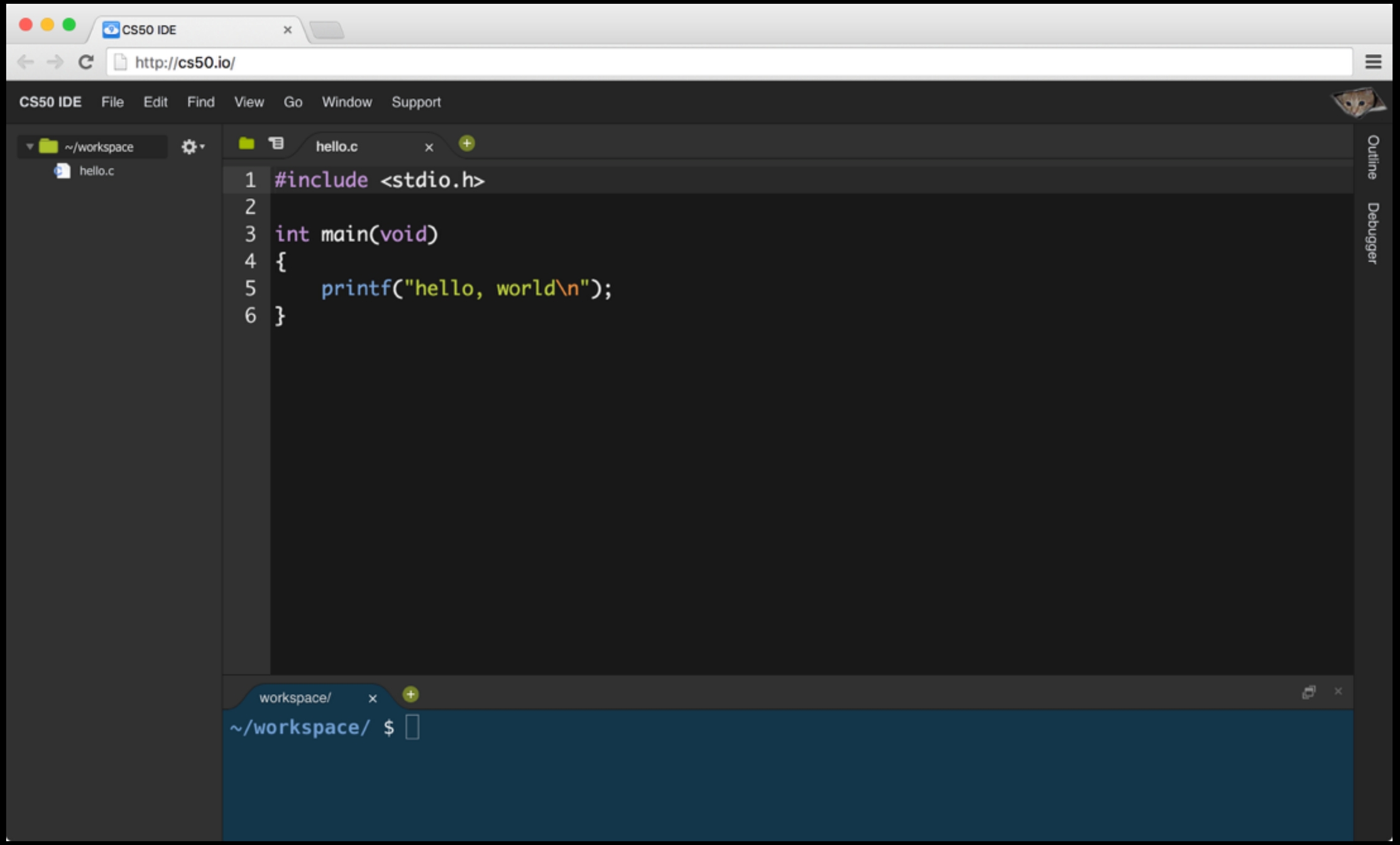
...

compiler

CS50 IDE

cs50.io


CS50 IDE
http://cs50.io/
CS50 IDE File Edit Find View Go Window Support
~/workspace
hello.c
hello.c
1 #include <stdio.h>
2
3 int main(void)
4 {
5 printf("hello, world\n");
6 }
Outline
Debugger
workspace/
~/workspace/ $


CS50 IDE
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CS50 IDE File Edit Find View Go Window Support
~/workspace
hello.c
hello.c
1 #include <stdio.h>
2
3 int main(void)
4 {
5 printf("hello, world\n");
6 }
Outline
Debugger
workspace/
~/workspace/ $

```
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

...
```

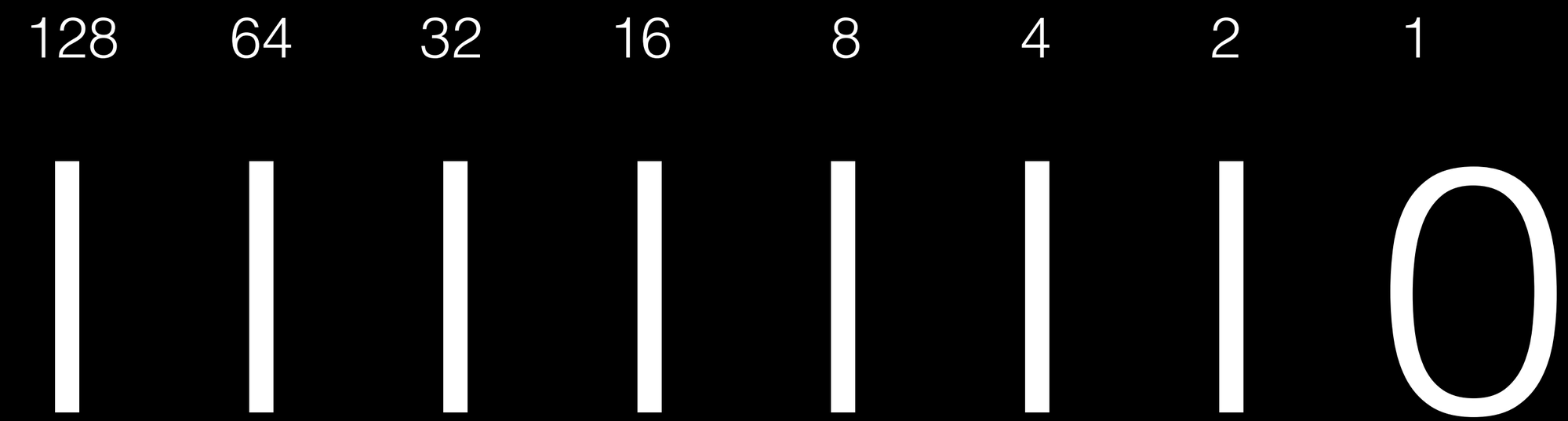
```
%c

%f

%i

%lld

%s

...
```

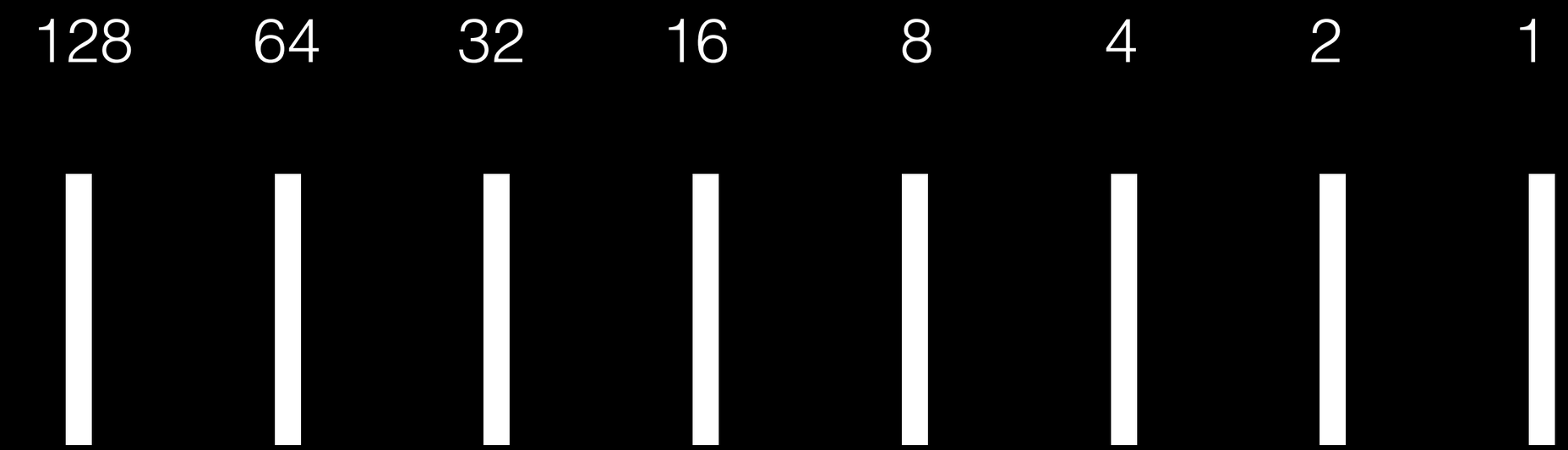
```
\a
\n
\r
\t
\'
\"
\\
\0
...
```

crucial
by Micron
47J6
4G85
8BB12
D6HXT
4G85
8BB12
D9HXT
4G85

amazon.com

integer overflow


128
64
32
16
8
4
2
1
1
1
1
1
1
1
1
0


128
64
32
16
8
4
2
1

128 64 32 16 8 4 2 1

00000000

wikia.com

B
4,000,000,000

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

nytimes.com

floating-point imprecision

```
printf

...
```

```
get_char

get_double

get_float

get_int

get_long_long

get_string

...
```

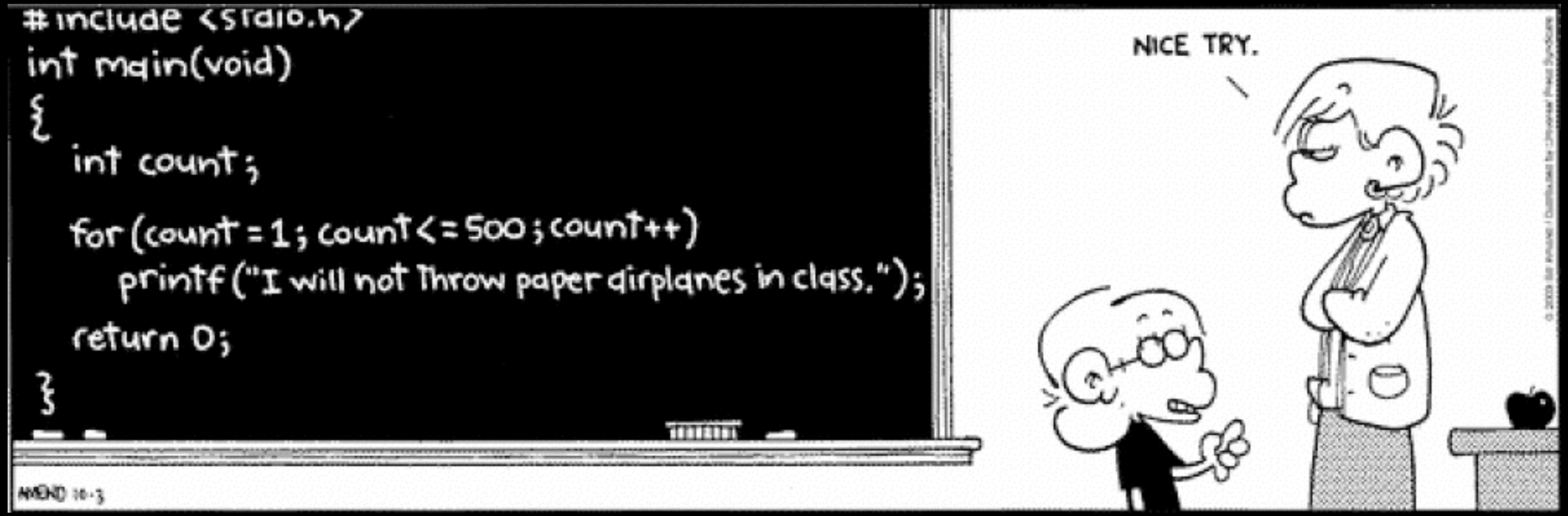
```
bool

char

double

float

int

long long

string

...
```

```
%c

%f

%i

%lld

%lu

%s

...
```

```
\a
\n
\r
\t
\'
\"
\\
\0
...
```

```
if

else

switch

for

while

do ... while

...
```

scope



http://www.gocomics.com/foxtrot/2003/10/03/

abstraction

```
make hello
```

preprocessing

compiling

assembling

linking

VS

C

C