

CS 150: Conditionals and While Loops

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```
x = 5
```

```
if (x < 3):
```

```
    x = 1
```

```
    print("A")
```

```
    if(x>100):
```

```
        print("B")
```

```
    else:
```

```
        print("C")
```

```
    print("D")
```

```
print("E")
```

```
if (x>2)
```

```
    print("F")
```

```
    if(x%3==2)
```

```
        print("G")
```

```
    if (x%3==1)
```

```
        print("H")
```

```
    else:
```

```
        print("I")
```

This will output

~~A. C D E F G I~~

~~B. D E F G~~

C. E F G I

D. E F H

E. I don't know

$x = 11$

Combining/Modifying Booleans

$(x < 3) \text{ and } (x = 11) - \text{False}$

- and

True and False \rightarrow False

True if and only if both are

$(x < 3) \text{ or } (x = 11) \rightarrow \text{true}$

- or

True if any are true

- not

True \rightarrow False

False \rightarrow True

$$\frac{x = 11}{\text{not } (x < 3)}$$

True

x = 7

y = (x > 4) and ((not (x > 8)) or (x == 5))

A. y = true

B. y = false

C. It depends

D. This will cause an error

E. I don't know

While Loop

Syntax

$x == 5$

while (<boolean>):

<body>

$x = 6$

while ($x > 5$):

print(x)

$x = x - 1$

Semantics

1. Evaluate <boolean>
2. If true, execute <body>, go to 1.
Else, exit the loop

6

Example

```
x = 6
```

```
while(x > 4)  
    print(x, end=' ')  
    x = x - 1
```

will print

A. 6 5

D. 5 4 3

B. 6 5 4

E. I don't know

C. 6 5 4 3

1st iteration - x 6

2nd - x 5

3rd x=4 - exit!

```
i=0
```

```
while (i<3)
```

```
    print(i, end=' ')
```

will print

A. 0 0 0

B. 0 1 2

C. 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0

D. 3 3 3 3 3 3 3 3 3 3 3 3
3 3 3

E. I don't know

*infinite
loop*

line never changes

How can we translate this code to a while loop?

```
for i in range(n):  
    <body>
```

```
i=0  
while(i<n)  
    <body>
```

Infinite

A *loop*

```
i=0  
while(i<n)  
    <body>  
    i = i + 1
```

B

```
i = 0  
while(i<n)  
    <body>  
    n = n + 1
```

C

```
i = 1  
while(i<n)  
    <body>  
    n = n + 1
```

D

E. I don't know

For vs While

- Use `for` when:
 - The number of iterations will always be the same
 - The increment to the loop variable is the same on every iteration

```

valid = False
while not valid:
    x = eval(input("Enter a number: "))
    valid = (x%2 == 1 and x%3 == 0)

```

boolean odd multiples of 3

Which number will get us out of the loop?

A. 2

True

C. 9

B. 6

D. None of the above

E. I don't know

*True
True == True*

*bool = False
bool = ~~1-4~~
2-4*

*X=4
foo = X+3
foo = 7*

~~break~~ Break

- Causes immediate termination of the loop
- Use carefully! It can make code very hard to read

```
x = 12  
while (True):  
    x = x + 1  
    if x > 12:  
        break
```

Which of these will exit on 9?

A `x = eval(input ("Enter a number: "))`
`while not (x%2 == 1 and x%3 == 0):`
 `x = eval(input ("Enter a number: "))`

B `x = eval(input ("Enter a number: "))`
`while True:`
 `if (x%2 == 1 and x%3 == 0):`
 `break;`
`x = eval(input ("Enter a number: "))`

C. Both

D. Neither

E. I don't know

Next Class

- Functions
- Reading
 - 6.4-6.7
- Lab 2 – Due Tuesday at 10pm
- Prelab 3 – Due Wednesday in class