

Clicker Groups			
Gabriel Simon	Peter Adler Asch	Ryan Gleklen	Row 1, right
Rand Zalzala	Lydia Smith	Katherine Moncure	Row 1, left
John Fabrizio	Ian Gilchrist	Xincheng (Tony) Li	Row 2, right
Carey Lyons	Ruthie Wittenberg	Keeley Hagenbuch	Row 2, right
Joel Miller	Hunter Zepeda	Jack Benson	Row 2, left
Katerina Walter	Krista Langhans	Sakina Lavingia	Row 2, left
Venkata Shiva Mandala	Michael Jacobs	Aaron (Shang Wei) Young	Row 3, right
Linnea Kirby	Eleanor Spielman-Sun	Sophia Tinger	Row 3, right
Kiran Melnyk	Randanno Tallini	Ethan Cohen	Row 3, left
Alicia Goshe	Mia Russell	Phoebe Anderson-Kline	Row 3, left
Connor Jackson	Santiago Gonzalez	Daniel Laufer	Row 4, right
Kirsten Vail	Claire Shank	Sol Solomon	Row 4, right
Robert Sohmer	Ben Shepherd	Kevin Barrett Kelly	Row 4, left
Emily Cohn	Olivia Fountain	Amy Campbell	Row 4, left
Ian Hankin	Max Bernstein	Ari Schwartz	Row 5, right
Rachel Schwartz	Annika Hansteen Izora	Matthew Loreti	Row 5, right
Kepler Mears	Kinori Rosnow	Charlie Perry	Row 5, left
Einav Silverstein	Adira Baum	Noah Margulis	Row 5, left
Simeon Deutsch	Nate Kirk	Evan Davies	Row 6, right
Nicholas Music	Griffin Jennings	John Burnett	Row 6, right
Peter Elgee	Arturo Octavio	Pete Sinn	Row 6, right
Jeremy Swack	Andrew Groble	Andrew Winslow	Row 6, left
Michael Orenstein	Joshua Hess	Melchior Maetzener	Row 6, left
Sam Meier	Eli Ferster	Gabe Smith	Row 6, left
Dan Lev	Cole Blouin	Zhaoxin (Josh) Hu	Row 7, right
Dan Howard	Brian Carney	Derek Palinski	Row 7, right
Alejandro Verdugo Guzman	Nick Care	Jamie Finucane	Row 7, right
Jordon O'Donnell	Kinsey Denney	Meredith Leung	Row 7, left
Jacob Farnsworth	Truman Braslaw	Bill Derrah	Row 7, left
Frederick Olsen	David Kahn	Owen McTigue	Row 7, left

CS 150: Expressions, Types, and Loops

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Announcements

- Lab code – 3216
- Lab helper hours – on website
 - 2 to 6 on weekends
 - 7 to 11 on M,W,Th
- Clickers required starting WEDNESDAY

Recall: Assignment Statements

- $\langle \text{variable} \rangle = \langle \text{expression} \rangle$

$$x = 7$$

$$y = 3 + 4$$

What is in an expression?

- Literal or constant

– 3, 137, 3.1415, -17

not change

X = 12

- Variable

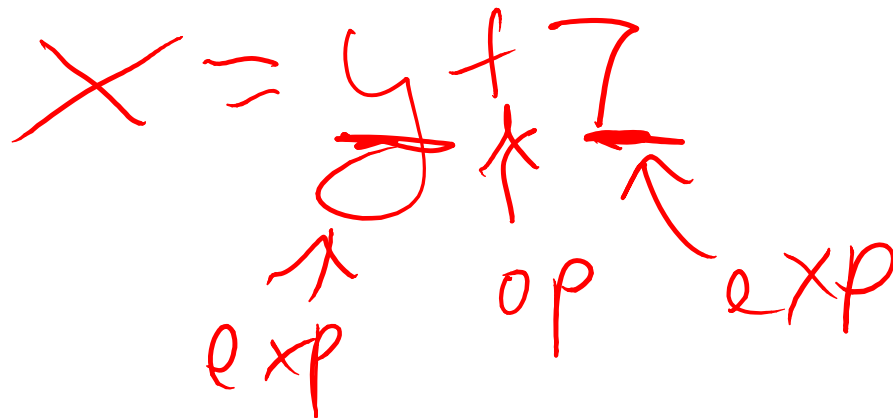
– x, height, thisIsAVariable

change value

X = y

What is an expression?

- <exp><op><exp>
- Operator
 - addition(+), subtraction(-), multiplication(*), division(/), integer division(/ /), mod(%)

Handwritten diagram illustrating the structure of an expression. The expression $X = 4 + 7$ is shown. The 4 is labeled exp (expression), the $+$ is labeled op (operator), and the 7 is labeled exp (expression). The entire expression is underlined.

Types

7 number

- All data is represented as a string of 0s and 1s
- The computer needs to know how to interpret these 0s and 1s
- Is it a number? Is it a string? If it is a number, does it have a decimal?

Types

- Integers (int) – whole numbers
 - 7, 3, -5, 1000
- Reals (floats, doubles): – decimals
 - 3.145, 3.0 9.7
- Strings //
 - “a”, “ex”, “?x7-1”, “Computer Science is awesome”
- Booleans – decision making
 - True, False

Operators and Types

$+$ $*$ $/$ $//$
float integer div
 $\%$ - remainder

We want to get the last 4 digits of a 10 digit number, x

A. $x \% 4$

remainder 14

B. $x \% 1000$

$112 \% 10 = 2$

C. $x \% 10000$

$112 \% 100 = 12$

D. $x \% 100000$

E. I don't know

Order of Operations

1. * / // %

2. + -

- Operations with the same precedence are evaluated left to right
- Overwrite order with parenthesis

Loops

- Let us repeat code (and vary very slightly)

- Syntax

- for <var> in range(<start>, <end>):

- <body>

for i in range(1, 5):
 sum = sum + i

Semantics

for <var> in range(<start>,<end>):
 <body>

for i in range(1,5)

1. Set <var> to <start>

i = 1

2. Execute <body>

3. Increment <var> by one

i = i + 1

4. If <var> is equal to <end>, stop. Otherwise, repeat 2-4

is i = 5?

Code

```
for i in range(1,5):  
    print(i,i*i,end='')
```

At the end of this code,
what will appear on the
terminal?

A

2 4 3 9 4 16

B

2 4 3 9 4 16 5 25

C

1 1 2 4 3 9 4 16

D

1 1 2 4 3 9 4 16 5 25

E. I don't know

```
for i in range(1,5):  
    print(i,i*i,end='')
```

print

Iteration 1

Variable	Value
i	1

output: 1 1

Iteration 3

Variable	Value
i	3

output: 3 9

Iteration 5

Variable	Value
i	5

Exit loop!

Iteration 2

Variable	Value
i	2

output: 2 4

Iteration 4

Variable	Value
i	4

output: 4 16

1. Set <var> to <start>
2. Execute <body>
3. Increment <var> by one
4. If <var> is equal to <end>, stop.
Otherwise, repeat 2-4

Code

```
for i in range(1,5):  
    print(i)  
    print(i*i)  
print("Done!")
```

How many times will we
print "Done!"?

A. 0

B. 1

C. 4

D. 5

E. I don't know

*for i in range(1,5):
 print("Done!")*

Alternative Forms

Levd

for i in range(7)

start at 0

equivalent to

for i in range(0, 7)

Code

```
for i in range(6):  
    print(i, i*i, end='')
```

2 //
[]

5 sep="" ↑
At the end of this code,
what will appear on the
terminal?

(0,6)

1111

A

1 1 2 4 3 9 4 16 5 25

B

0 0 1 1 2 4 3 9 4 16

C

0 0 1 1 2 4 3 9 4 16 5 25

D

0 0 1 1 2 4 3 9 4 16 5 25 6 36

E. I don't know

Alternative Forms

<start> <end> <iteration>

for i in range(0, 7, 2)

– adds 2 instead of 1 each round

for i in range(0, 7)

is equivalent to

for i in range(0, 7, 1)

Code

```
for i in range(1,6,2):  
    print(i,end='')
```

At the end of this code,
what will appear on the
terminal?

A

1 3 5

B

2 4 6

C

1 3 5 7

D

1 2 3 4 5

E. I don't know

i 1
i 3
i 5

~~for i in range(1,6,2):~~
no run

i = 1
done!

Code

```
for i in range(12, 6, -2):  
    print(i, end='')
```

At the end of this code,
what will appear on the
terminal?

A

10 8

B

10 8 6

C

12 10 8

D

12 10 8 6

E. I don't know

For Loop Syntax

```
for i in range(7)
```

```
for i in range(1, 7)
```

```
for i in range(0, 7, 2)
```

```
for i in range(13, 10, -1)
```

Next Class

- More Loops
- Reading
 - 2.6-2.8,3.3-3.4
- Lab 1 – Due Tuesday at 10pm
- Prelab for Lab 2 – Due Wednesday in class