

CSE 8A: Intro to Programming in Python

Spring 2021

Lecture 2 - Expressions, Data Types, Variables

UC San Diego

Lecture will be recorded!

Announcement

- Lab I this Thursday
 - lab activity
 - lab quiz

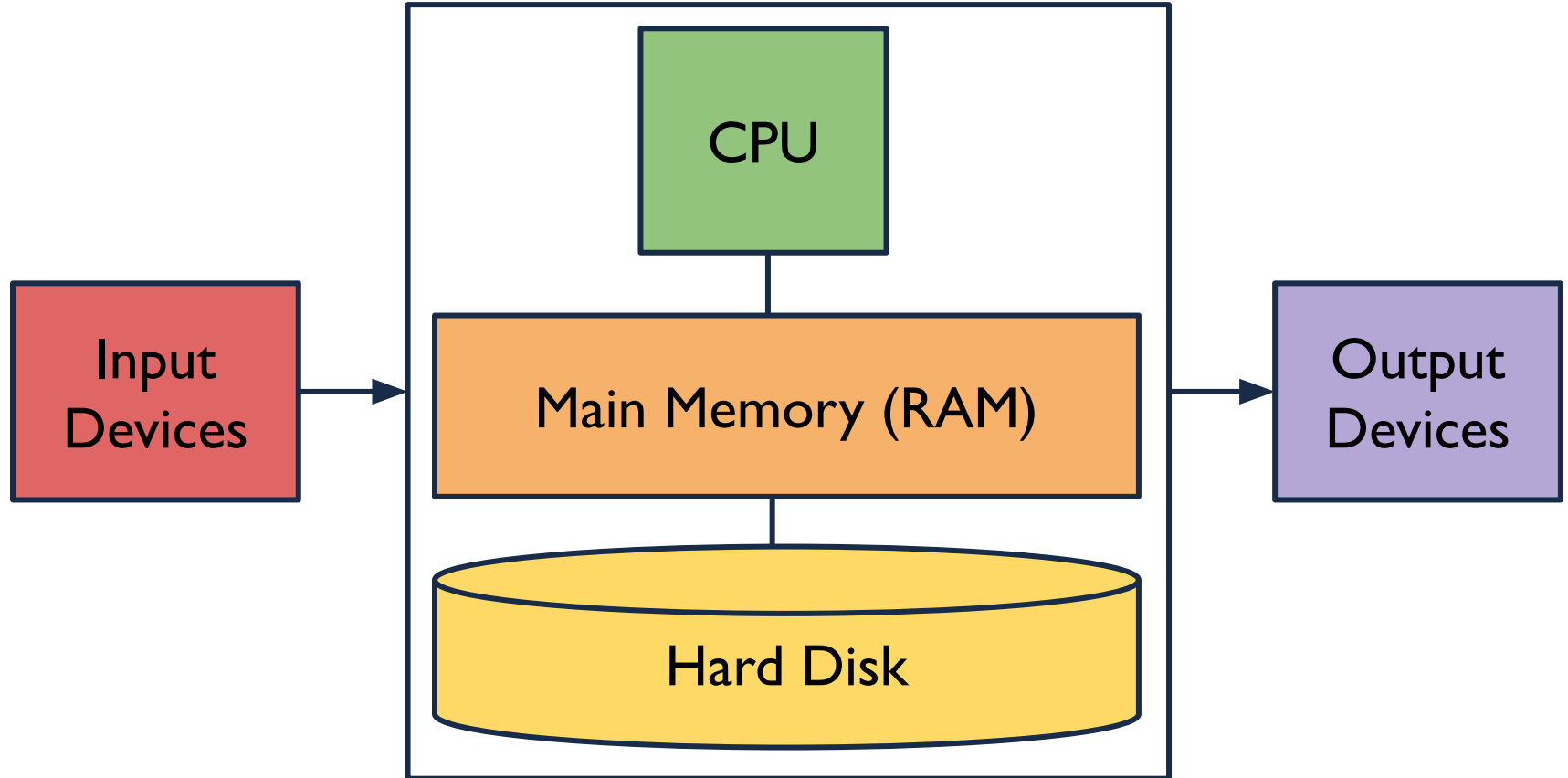
Topics for Today

- What is Programming?
- Expressions
- Order of Operations
- Numeric Data Types
 - int
 - float
- Variables
- Strings

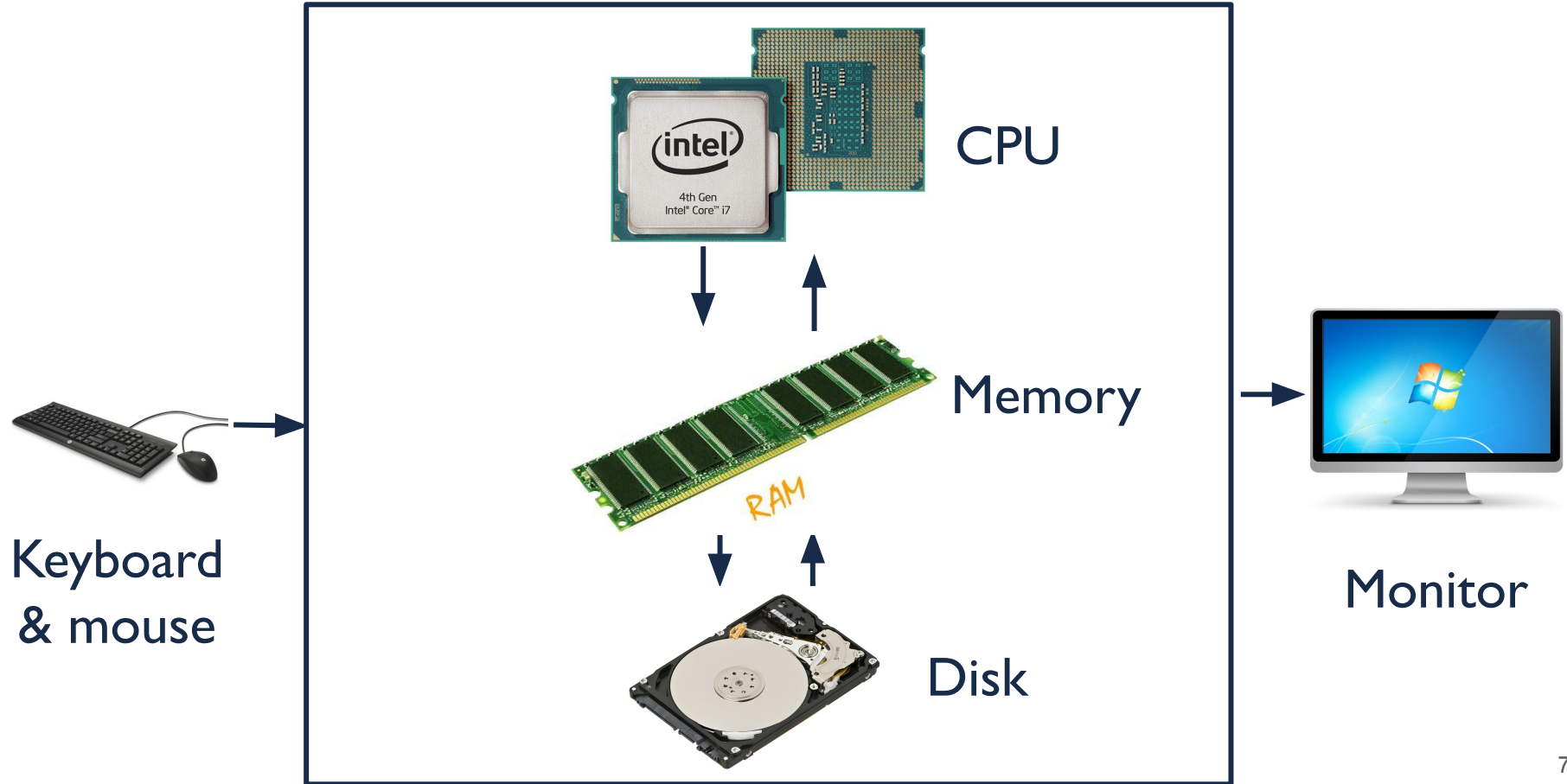
What is CSE 8A?

Introduction to Computer Science
and Programming in Python

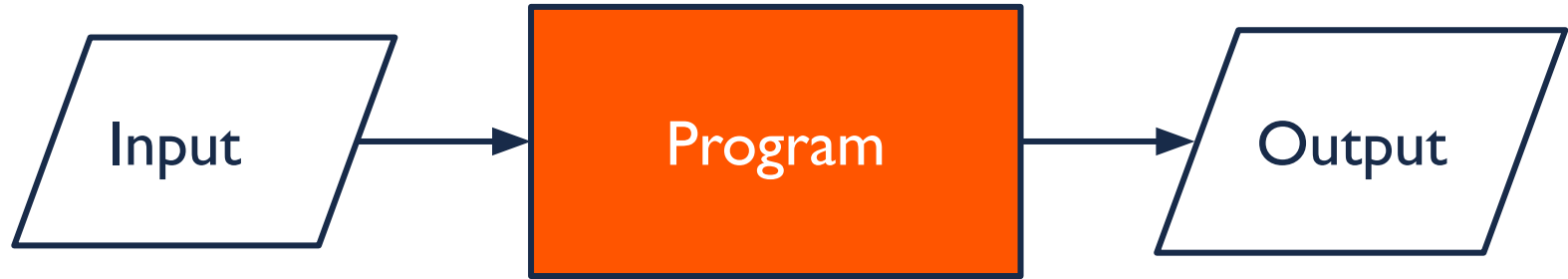
What is a Computer?



What is a Computer?

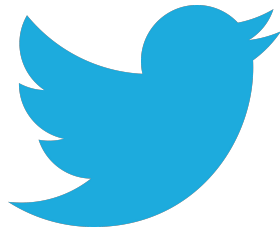
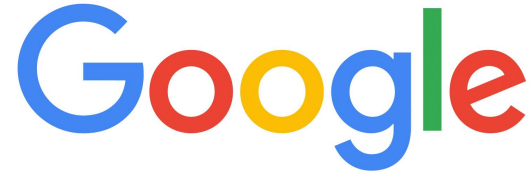
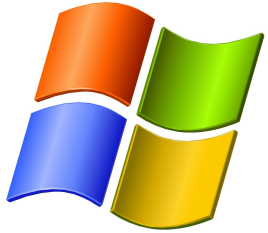


What is a program?



What programs do we use everyday?

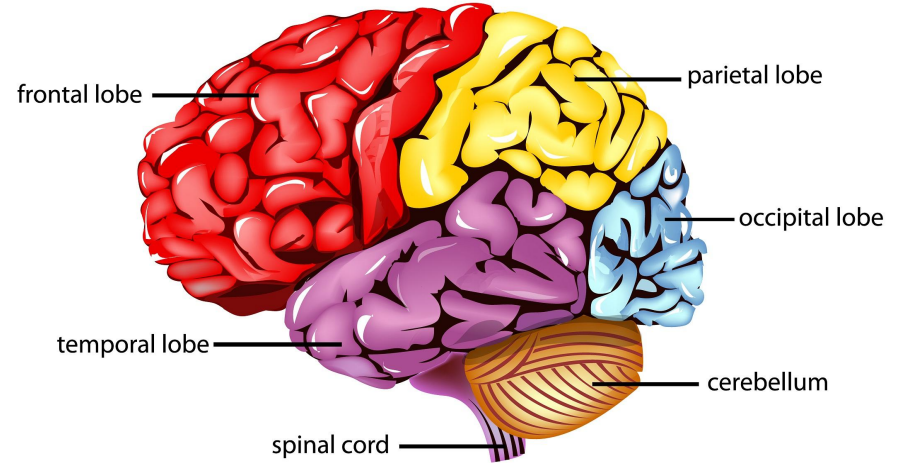
Famous computer programs/services



CPU vs Human Brain



Understands **only** 0s and 1s



Understands **some** Natural Languages

Can you read this?

Todo está bien

一切都很好

எல்லாம் நன்மைக்கே

All is well

Can you read this?

01010100 01010010 01001001 01010100 01001111 01001110

Can you read this?

01010100 01010010 01001001 01010100 01001111 01001110

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How to make a computer print “Tritons”?

- Need to communicate in a language that the computer understands
- Problem
 - Computers understand only **binary numbers** (0, 1)
 - Humans have trouble understanding binary numbers
- Solution
 - **High-level programming language** (e.g., Python)

Demo: **Hello, Tritons!**

Exercise: Expressions

What is the result of the expression below?

`>>> 5 + 7`

- A. `5 + 7`
- B. `12`
- C. `'5 + 7'`
- D. None of the above

Exercise: Expressions

What is the result of the expression below?

```
>>> "5 + 7"
```

- A. $5 + 7$
- B. 12
- C. '5 + 7'
- D. None of the above

Exercise: Expressions

What is the result of the expression below?

`>>> 7 / 2`

- A. 3
- B. 3.5
- C. '7 / 2'
- D. None of the above

Exercise: Expressions

What is the result of the expression below?

```
>>> 7 // 2
```

- A. 3
- B. 3.5
- C. '7 / 2'
- D. None of the above

Exercise: Expressions

What is the result of the expression below?

`>>> 7 % 2`

- A. 1
- B. 2
- C. 3
- D. 3.5

Exercise: Expressions

What is the result of the expression below?

```
>>> 2 ** 4
```

- A. 4
- B. 8
- C. 16
- D. 32

Exercise: Order of Operations

What is the result of the expression below?

`>>> 3 + 4 * 5`

- A. 12
- B. 23
- C. 35
- D. 60

Exercise: Order of Operations

What is the result of the expression below?

```
>>> 3 - 2 ** 4 % 3 * (4 + 1)
```

- A. 1
- B. 0
- C. -1
- D. -2

Exercise: Numeric Data Types

What is the **data type** of the expression below in **Python**?

```
>>> 42
```

- A. int
- B. float
- C. string
- D. number

Exercise: Numeric Data Types

What is the **data type** of the expression below in **Python**?

```
>>> 42.0
```

- A. int
- B. float
- C. string
- D. number

Exercise: Numeric Data Types

What is the **data type** of the expression below in **Python**?

```
>>> 5 / 2
```

- A. int
- B. float
- C. string
- D. number

Exercise: Numeric Data Types

What is the **data type** of the expression below in **Python**?

```
>>> 5 // 2
```

- A. int
- B. float
- C. string
- D. number

Variables

A storage location

- name
- value
- type
 - `year = 2020` is equivalent to `year : int = 2020` when you declare a variable
 - everything has a type except python doesn't force the programmer to do it
 - Java, C++, C requires specific types at variable declarations

Exercise: Variables

What is the **result** of the statements below?

```
year = 2021
```

```
year += 1
```

```
year
```

- A. 2019
- B. 2020
- C. 2021
- D. 2022

Exercise: Variables

What is the **result** of the statements below?

```
year = 2021
```

```
year += 1
```

```
year
```

- A. 2019
- B. 2020
- C. 2021
- D. 2022

Exercise: Variables

What is the **result** of the statements below?

```
year = 2020
```

```
next_year = year + 1
```

```
year = 2021
```

```
next_year
```

- A. 2019
- B. 2020
- C. 2021
- D. 2022

Exercise: Variables

What is the **result** of the statements below?

```
year = 2020
```

```
year = 2021
```

```
next_year = year + 1
```

```
next_year
```

- A. 2019
- B. 2020
- C. 2021
- D. 2022

Exercise: Strings

What is the **result** of the statements below?

```
name = "cse 8a"
```

```
"Hello" + name
```

- A. 'Hello cse 8a'
- B. 'Hellocse8a'
- C. 'Hello name'
- D. 'Hellocse 8a'

Exercise: Strings

What is the **result** of the statements below?

```
name = "cse 8a"
```

```
"Hello" + "name"
```

- A. 'Hello cse 8a'
- B. 'Hellocse8a'
- C. 'Hello name'
- D. 'Helloworld'

Exercise: Strings

What is the **result** of the statements below?

```
name = 'Maria'
```

```
position = 'best'
```

```
name + ' is the ' + position
```

- A. 'Maria is the best'
- B. 'name is the position'
- C. 'Maria + is the + best'

Exercise: Strings

What is the **result** of the statements below?

```
'CSE 8A is ' + 'so' * 3 + ' much fun!'
```

- A. 'CSE 8A is so much fun!'
- B. 'CSE 8A is so 3 much fun!'
- C. 'CSE 8A is so so so much fun!'
- D. 'CSE 8A is sososo much fun!'

Coding exercise

Given the Fahrenheit, please convert it to celsius.