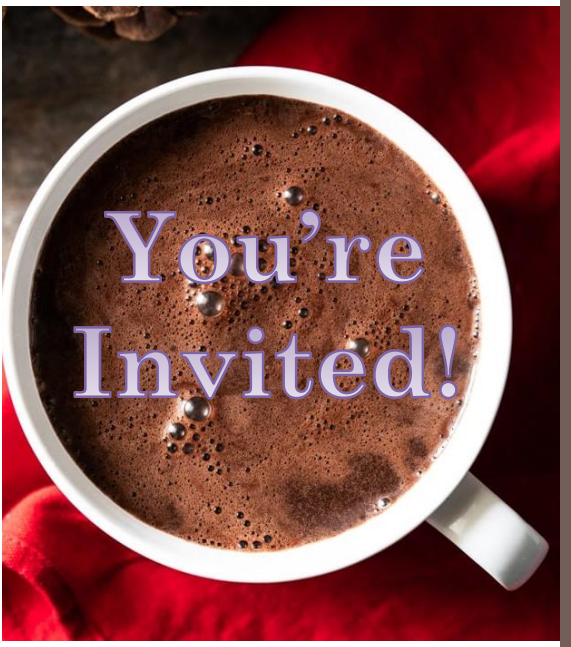
CS 1112: Introduction To Programming

Python Basics; Hello World; Printing; Comments (Confirming Python & PyCharm!)

Dr. Nada Basit // basit[*at*]Virginia[*dot*]edu

Friendly Reminders

- Your ***safety*** and ***comfort*** is important!
  - If you choose to wear a mask you are welcome to do so
  - *We will interpret wearing a mask as being considerate and caring of others in the classroom (not that you are sick), and realize that some may choose to mask to remain distanced*
- Remember to always be **kind, respectful, supportive, compassionate and mindful of others!** ☺
- Be an ***active*** participant in your learning!
  You're welcome and ***encouraged*** to ask questions during class!
- If you feel ***unwell***, or think you are, please stay home
  - *Contact us!* *We will work with you!*
  - Get some rest ☺
  - View the recorded lectures – *please allow 24-48 hours to post*



SWEET SIPS SOCIAL

Friday, January 17, 2025
3:00 PM to 4:00 PM
Davis Commons

UVA Department of Computer Science

Place-out? Waitlist?

- Place-out Test for CS 11xx
  - Think you are already familiar with the fundamentals of programming? Consider taking the place-out test for CS 11xx!
    - https://uvacsadvising.org/placeout.html#taking-the-place-out-test
    - The test will be open through Tuesday (Jan. 21) – *Check with CS Office to confirm*
- Waitlist
  - If you need CS 1112 – feel free to stay on the waitlist
  - **Don't forget to sign-up!** *(So that I know you are active and attending!)*
  - Considering ***switching*** to CS 1110 or CS 1111? Please let me know.
- Note: being on a waitlist **doesn't guarantee** enrollment into a course
  - Your instructor cannot force your enrollment into a section that is already full
  - In rare circumstances, a dean or the registrar may be able to help

Reminder…

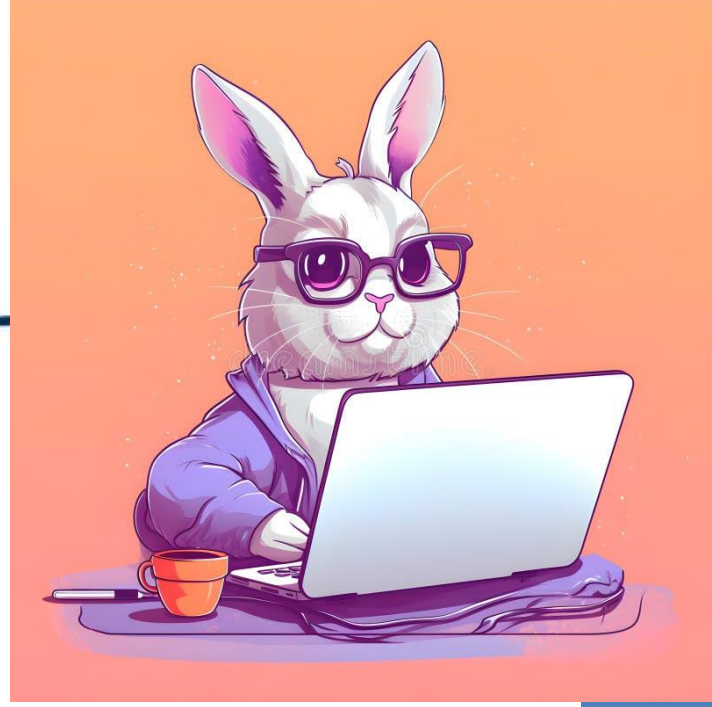
Syllabus Quiz ("Quiz 0")

Don't forget to take the Syllabuzz Quizz!

- This quiz is *Mandatory!*
- This quiz is located on **Canvas** (see tab on left-hand side).
- Take this quiz ***individually***. Absolutely no collaboration permitted.
- Must get **100%** to stay in the course! *May take it as many times as needed.*
  - Review the detailed Syllabus
  - This quiz is ***open-book***
  - See score out of 12 points on Canvas Grades to confirm you've completed the quiz
- ***Where?:*** *"Assignments" tab > "Syllabus Quiz (Required)"*; **or** *"Quizzes" tab*
- ***Deadline:*** **January 29 @ 11:00pm**. (Just after the add deadline). *Take it early!*
  - *Most students should aim to finish the Syllabus Quiz by January 24, 2025*

TA Introductions ☺

For All Students…



CS 1112 Pledge!

Taking this pledge is mandatory for our class to have a community of trust

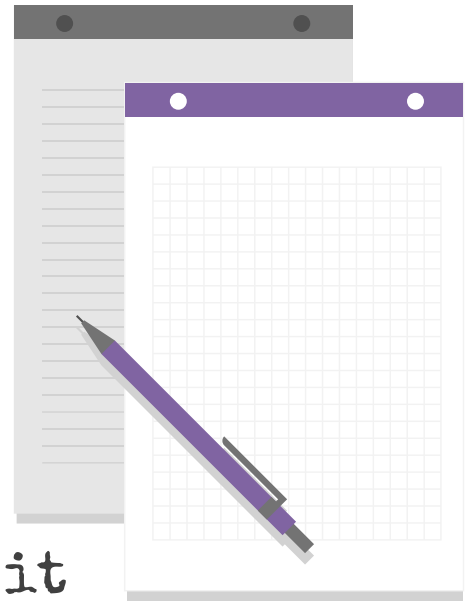
★ Google form: https://forms.gle/dsCdr4CeMbFF184u5 *(try this first)*

★ Microsoft form: https://forms.office.com/r/N08QnezyMM

[Please submit your pledge at only ONE of the above links!]

I gratefully acknowledge Prof. J. Cohoon for introducing the course pledge in this course!

A Little Bit of Housekeeping…

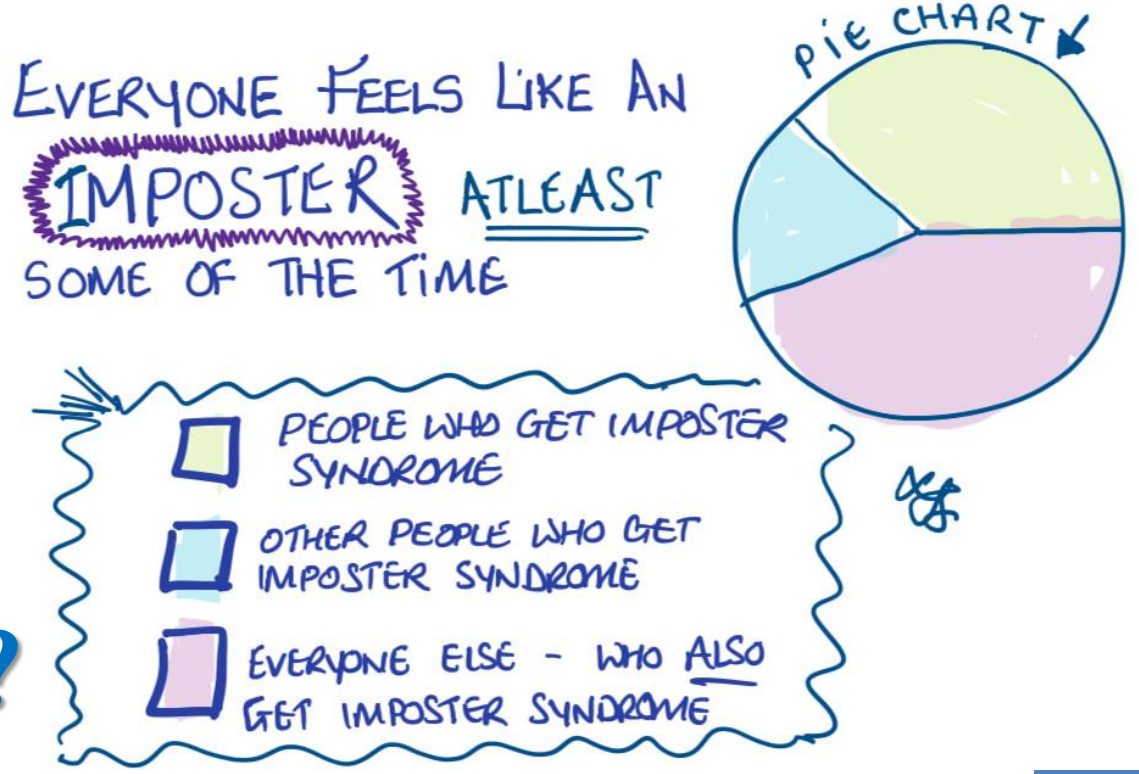


Create a folder somewhere where you can easily find it (Desktop, Documents, …) and name it "CS 1112"

Put everything related to this course inside this folder – you will have many artifacts by the end of the semester!

Reminder…

- Ever Think You Are An Imposter?
- Wonder whether UVA made the right decision?



Well, we think UVA made the right decision! ☺ Watch this video this weekend to be sure: Click HERE!! The video is about 20 minutes long. Watching it will be a great investment in your education, should help your test performance, and improve your job interviewing prowess!

I gratefully acknowledge Prof. J. Cohoon for discovering & sharing this wonderful resource!

Quick & Fun Survey Questions

Get to know your peers! ☺

Cold weather or Hot weather?

Were You Successful In Installing Python and PyCharm?

Follow the installation guide corresponding to your computer's operating system (Windows or Mac). Use the instructions document.

On Canvas: Files > Installation Documents > MacOS_Installation.zip
Files > Installation Documents > WindowsOS_Installation.zip

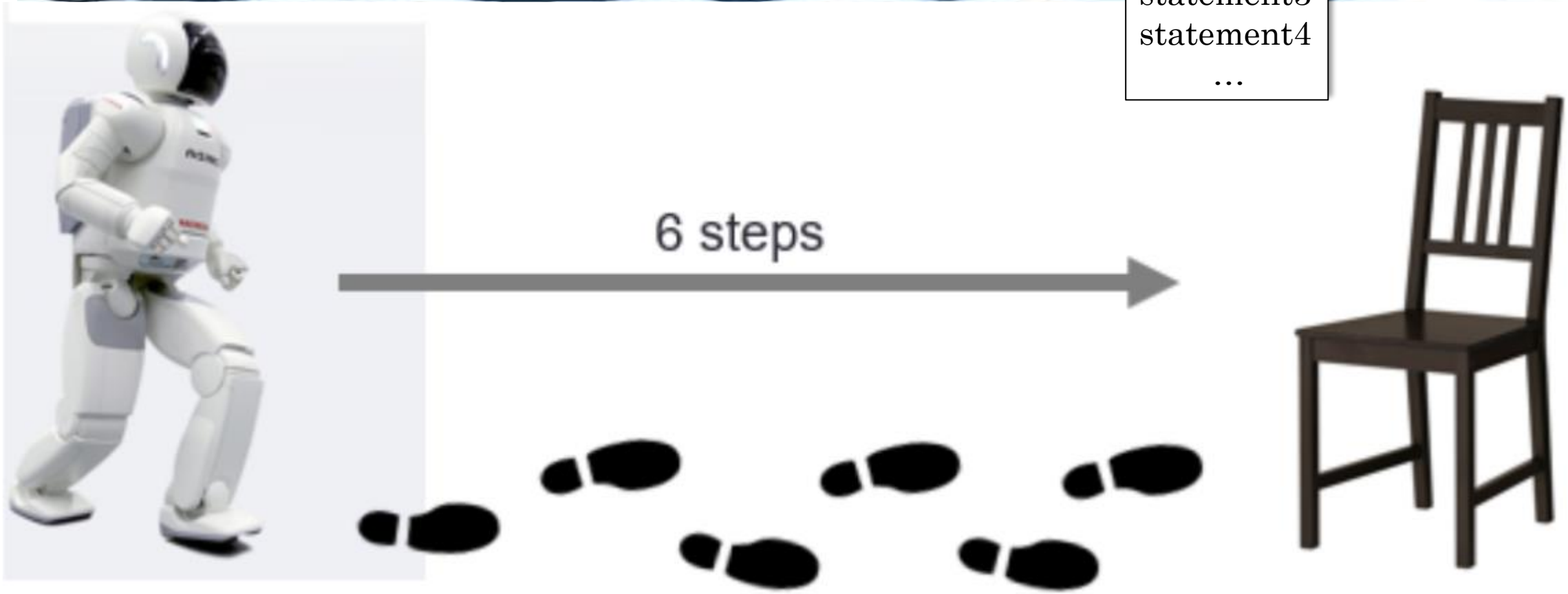
Building Blocks of Programs

Building Blocks of Programs

- **Sequence**
  - We start with the instruction written at the top
  - We go in order, one instruction at a time
  - Each line is "one" thing to do
- **Repetition** = *repeat something*
  - Repeat a fixed number of times (e.g., repeat 3 times)
  - Repeat **UNTIL** something happens (e.g., repeat *until* input is valid)
- **Conditions/Decisions** = *maybe do something*
  - Check something first; i.e., If there is a file present, read it
- **Named actions**
  - Grouping many lower-level actions into **one** higher level **name**
  - We think of a named action in 2 different ways
    - Definition of the name action
    - Use of the named action
  - i.e., "`Get Lunch`" is comprised of several smaller actions (walk to restaurant, order food, pay, etc.)

Sequence

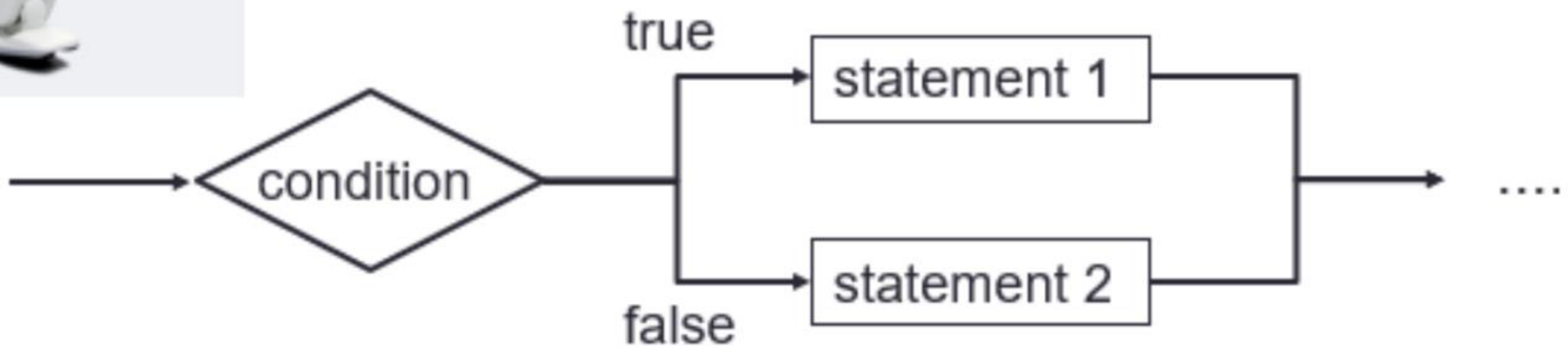
```
statement1
statement2
statement3
statement4
...
```



walk, walk, walk, walk, walk, walk, right-turn-180-degree, sit

Conditional

```
if (condition):
    statement1
    statement2
else:
    statement3
    statement4
    statement5
```

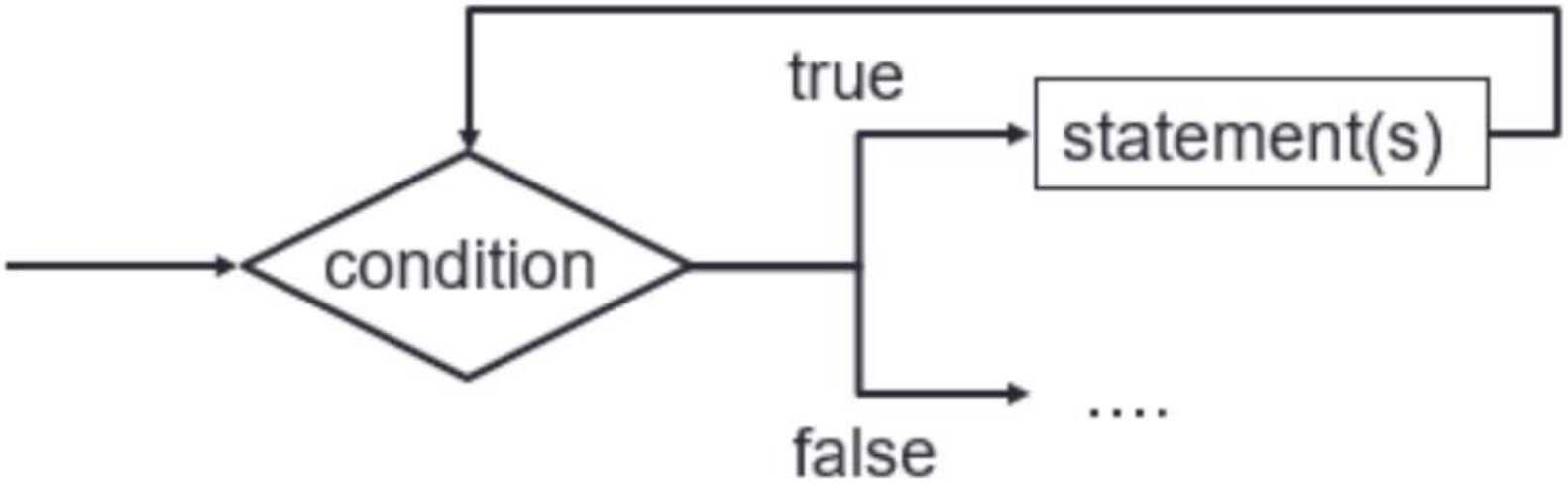


Repetition

```
while (condition):
    statement1
    statement2
statement3
```

? steps

- ~~Repeatedly walk 6 steps~~
- Repeatedly walk until you are in front of the chair
- Right-turn-180-degree
- Sit



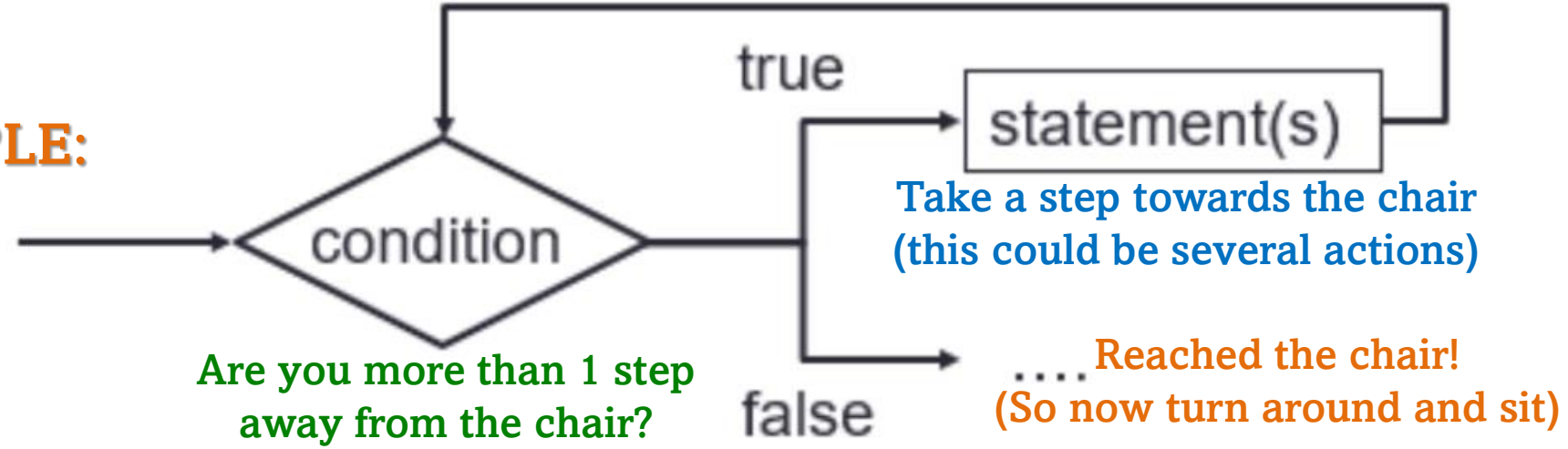
Repetition

```
while (condition):
    statement1
    statement2
statement3
```

? steps

- ~~Repeatedly walk 6 steps~~
- Repeatedly walk until you are in front of the chair
- Right-turn-180-degree
- Sit

EXAMPLE:

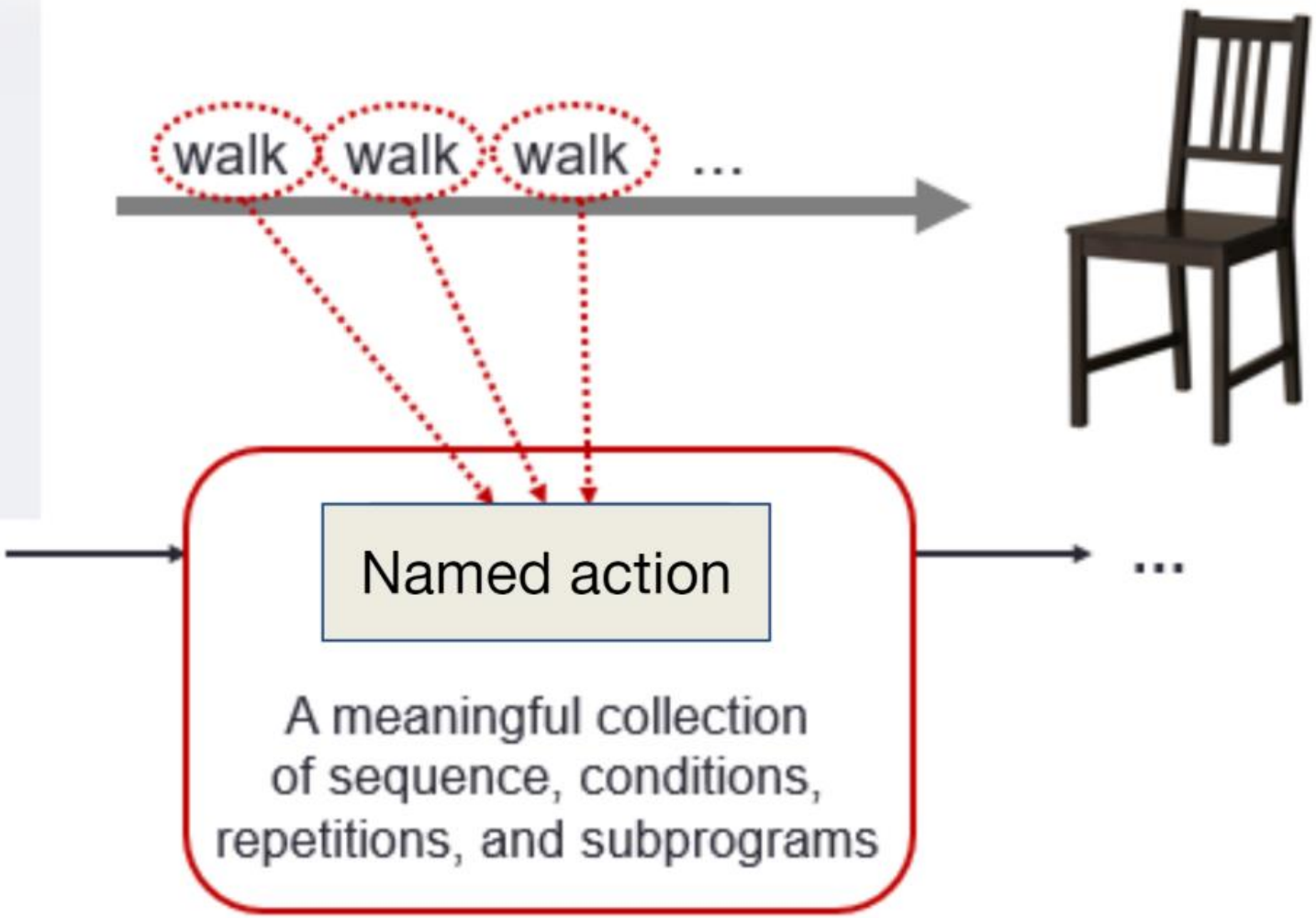


Take a step towards the chair
(this could be several actions)

Are you more than 1 step away from the chair?

....Reached the chair!
(So now turn around and sit)

Named Action



Algorithms (revisited)

- An algorithm is a step-by-step list of instructions to solve a problem
  - These steps must be followed EXACTLY
    - If you ever find yourself shouting at the computer *"Come on, you know what I mean!"*, **it doesn't.** Computers do exactly what you tell them, but will be VERY passive-aggressive about it

- Ways to describe an **algorithm**
  - Pseudocode ("*kinda*" code)
  - Flowchart (Diagram)
- Think of the **general solution** first before you try to write code to solve the problem!

What Makes a Good Algorithm?

- UNAMBIGUOUS
  - There are precise instructions that cannot be misinterpreted, that explain what to do each step AND what step to go to next
- EXECUTABLE
  - Each step can be carried out in practice
- TERMINATING
  - It will eventually come to and end
- DETERMINISTIC
  - It will do the "same thing" each time it is run
- CORRECT
  - Produces the right answer

- When describing an algorithm, don't think about implementation (coding) yet, focus on *"how do I solve this problem."*

What Makes a Good Algorithm?

- UNAMBIGUOUS
  - There are precise instructions that cannot be misinterpreted, that explain what to do each step AND what step to go to next
- EXECUTABLE
  - Each step can be carried out in practice
- TERMINATING
  - It will eventually come to and end
- DETERMINISTIC
  - It will do the "same thing" each time it is run
- CORRECT
  - Produces the right answer

Ambiguity

Prevalent in human language

No place for it in programming!

"She saw a woman on a hill with a telescope."

(who had the telescope?)

"A man walks into a bar." ***(ouch!)***

- When describing an algorithm, don't think about implementation (coding) yet, focus on *"how do I solve this problem."*

Bad Algorithm: Ambiguous

- "Bake it for a ***few*** minutes"

?

"How many minutes?"

Bad Algorithm: Not Executable

- "Bake it at ***10,000*** F"

!

"I can't do that!"

Bad Algorithm: Non-Terminating

- "Stir the batter (forever?!)"

∞

"…that's a long time!"

Bad Algorithm: Incorrect

- "Burnt Cookies"

By contrast: Hello World in Java

```
import java.io.*;

public class HelloWorld {
    public static void main (String[] args) {
        System.out.println("Hello World!");
    }
}
```

This is a simple yet complete Java program. It does one thing: Prints "**Hello World!**"
Output:

```
Hello World!
```

By contrast: Hello World in Java (with Comments)

```
/* Below is an import statement
 * it is used if you want to use code from other packages
 */
/* Java.io.* is all of Java's input/output stuff */
import java.io.*;

public class HelloWorld { // Class declaration (common single-line comment)
  /**
   * The main method of the program.
   * This is a Java doc comment, note the " /** "
   * @param args - variable for the input array of Strings
   */
  public static void main (String[] args) {
    /* This is how you print to the console */
    System.out.println("Hello World!");
  }
}
```

(This is a multi-line comment, note the " /* ")

What is System.out.println() ???

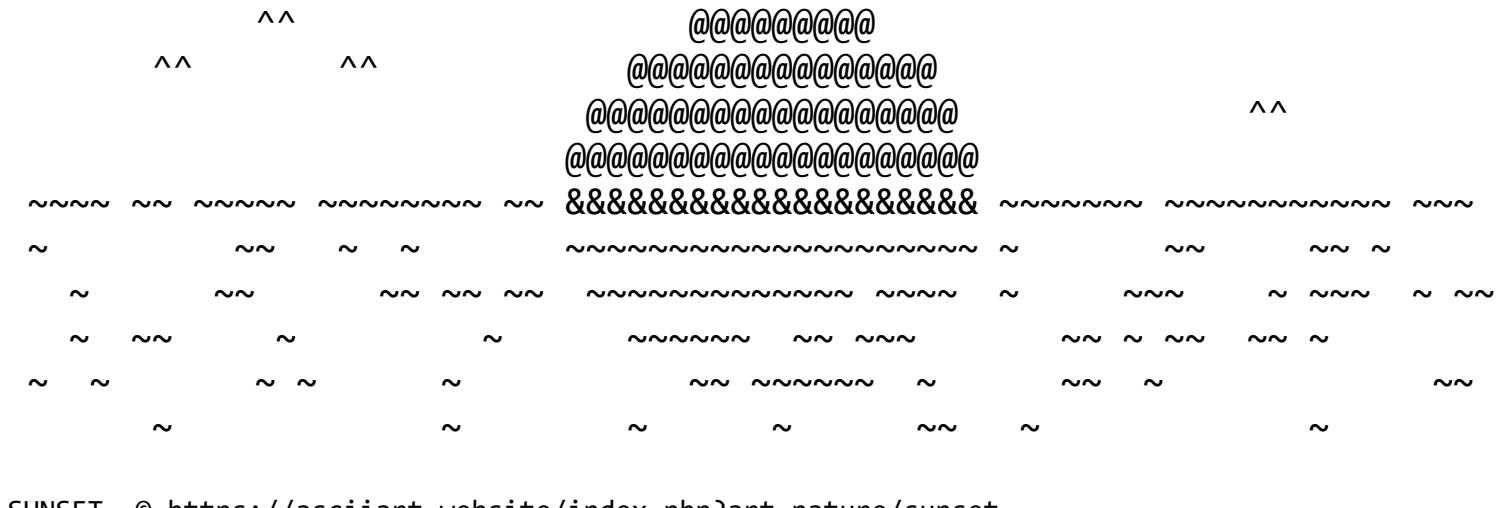
Python Demonstration

Introducing Basics of Python

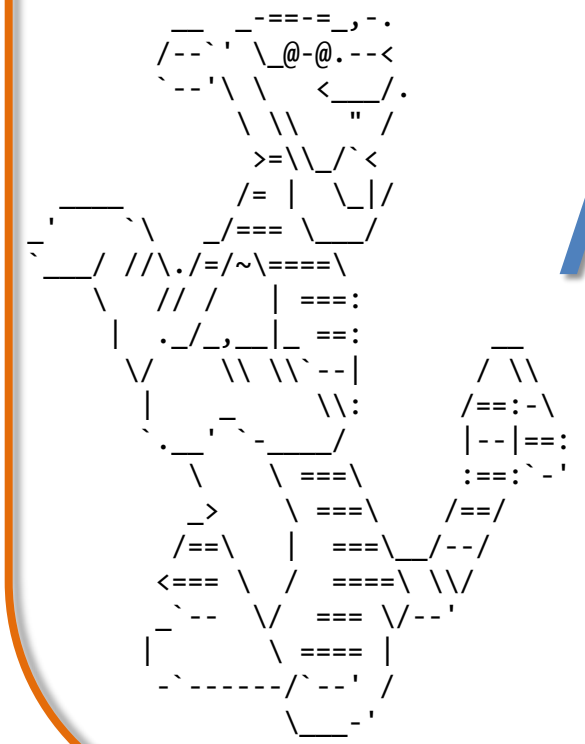
PyCharm environment (brief)

Simple Printing (using `print()` function) and Commenting

In-Class "lab" Activity: ASCII Art



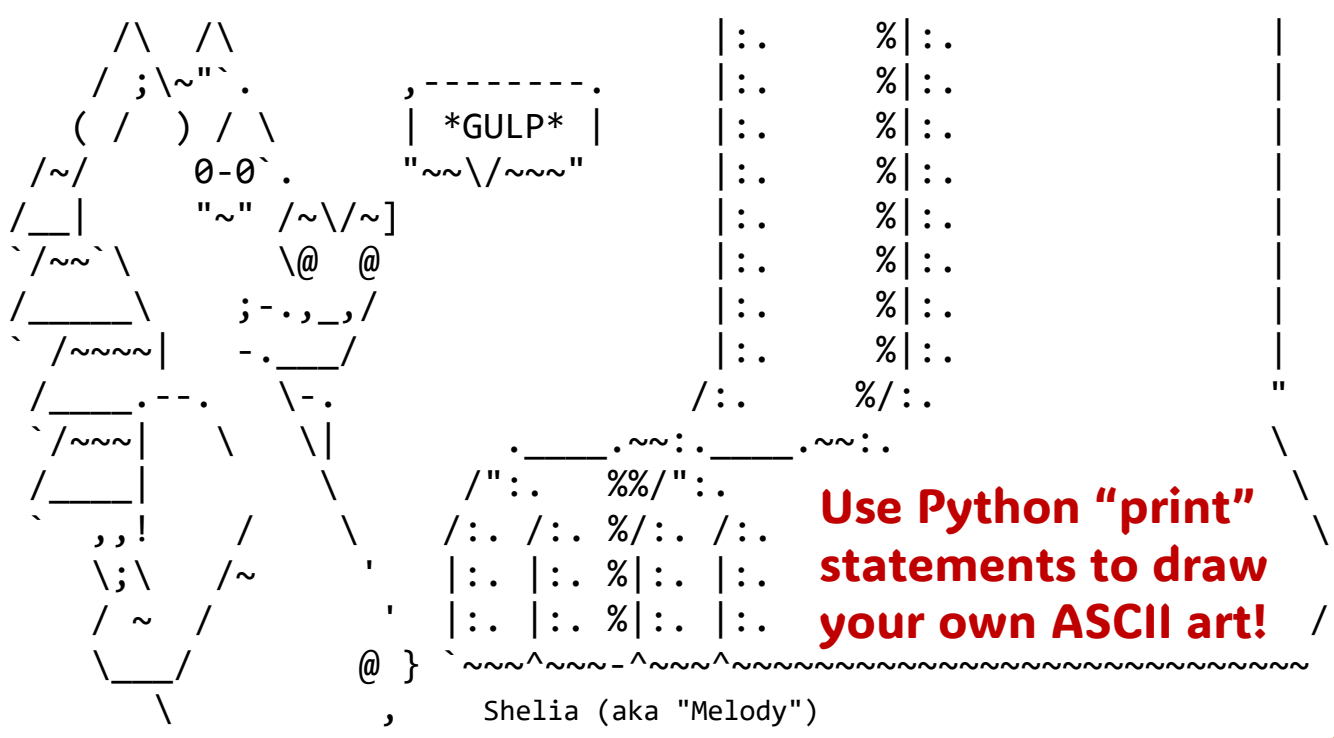
SUNSET © https://asciiart.website/index.php?art=nature/sunset



© https://asciiart.website/index.php?art=books/winnie%20the%20pooh

ASCII ART!

ACTIVITY



© https://asciiart.website/index.php?art=creatures/monsters

Have a Great MLK Holiday!

- NO CLASS AND NO OFFICE HOURS ON MONDAY 1/20/2025
- SEE YOU IN CLASS NEXT WEDNESDAY!

Notes/Reminders…

CS Laptop Loaner Program

- This course requires students to have a laptop
- I realize that not everybody might have one (nor necessarily need on for their desired major / path…)
- If you do not have a laptop for any reason… ***not to worry!***
- The CS department's Systems staff has a notebook / laptop loaner program and will be able to loan you a notebook / laptop computer for the duration of the semester if you don't have one or if you cannot afford one.
  - Also available if your laptop is broken and under repair, we can arrange for you to receive a loaner laptop for a week or two until your own laptop is fixed

Interested? Link: https://www.cs.virginia.edu/wiki/doku.php?id=cs_laptop_loaner

I am happy to be your sponsor. Please let me know.

Tools: Piazza

- We will use **Piazza** in the following way:
  - Website: https://piazza.com/ [Linked through Collab]
  - Piazza is a great tool for asking questions about **course content**, **policies**, or getting help on **homework** assignments
  - While you are waiting for an answer, see if there's an answer you can provide to someone else's question. We're all in this together! CS is a team sport! ☺
  - TAs will monitor and answer questions throughout the semester
  - Not a means to help you debug your code! (See more below)

It is very important to remember the following:

- **Do not post** complete or partial code solutions (for Homework) on Piazza when seeking answers to your question unless it is in a **PRIVATE** post
- **Do not post** complete or partial quiz solutions (code or short-answer) when seeking answers to your question unless it is in a **PRIVATE** post

Tools: Gradescope

- We will use **Gradescope** in the following way:
  - Website: https://www.gradescope.com/
  - Homework assignments will be **submitted**
    - Most programming assignments are autograded
    - Some aspects of programming assignments may be manually graded