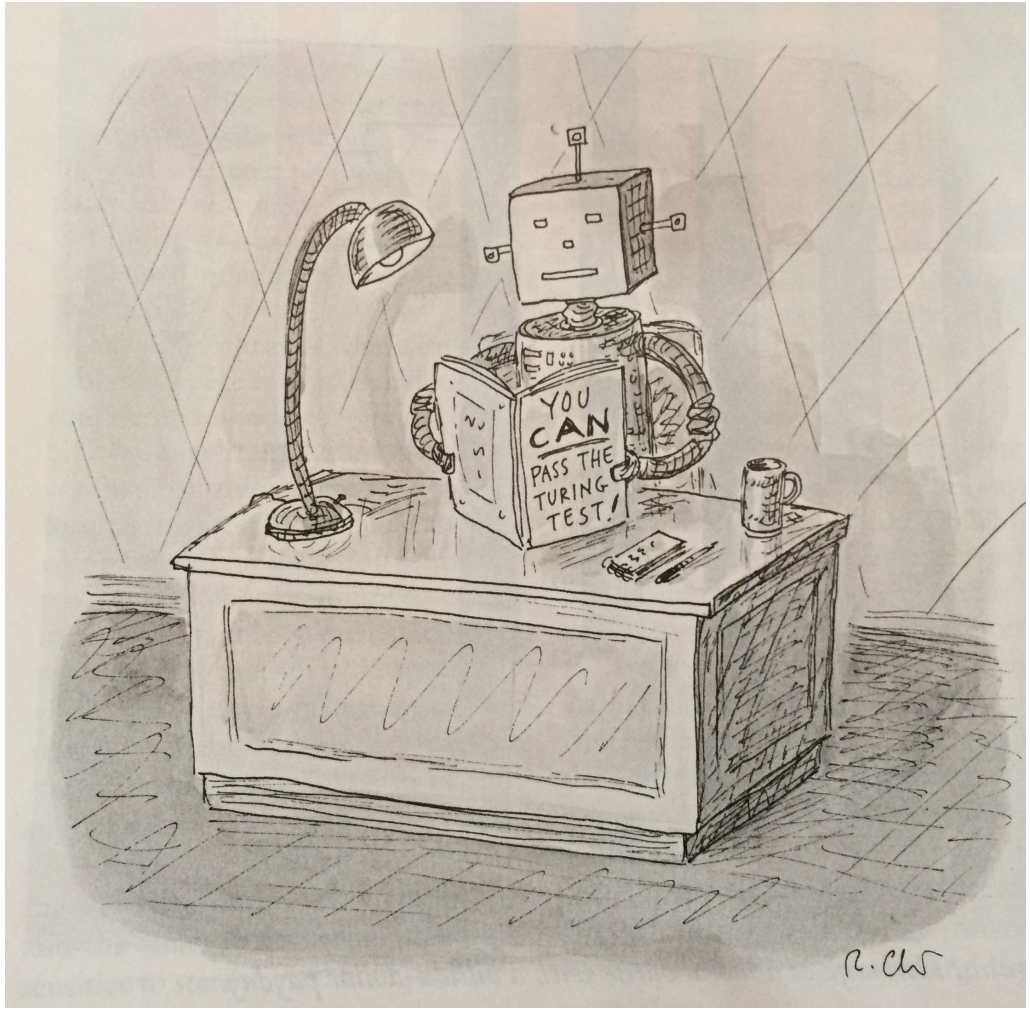
CSC 111:
Intro to Computer Science through Programming

Spring 2017
Prof. Sara Mathieson

Final Review Day

Pick up a study sheet and a number



Admin

- Encouraged: TA hours, office hours, Piazza for final review
- **Final project** is due May 3 (Wednesday)
- TA review session: May 3 (Wednesday), 7:30-9:30pm
- Practice midterm during lab this week
- Self-scheduled **final exam** (similar style to the midterm)
- **Last office hours: Monday 3-5pm (final prep only)**

Outline: 5/1

- While loops
- Files
- Dictionaries
- Activity that combines while loops, files, and dictionaries
- Wed: recursion and classes

Preparing for the Final

Study Strategies

- Use the development of your cheat sheet as a way to structure reviewing the material
- Go over lectures notes/code, homeworks, labs (your code and the solutions)
- Use the shell to test out things as much as possible
- Redo parts of in-class code or assignments on paper without looking at the solutions
- Take the practice midterm and review the feedback
- Do the practice problems in the book

Practice Midterm

- During each lab section (you don't have to go to your assigned section)
- TAs will provide feedback
- I will add **3 points to your final exam score** if you take the practice midterm during lab, give an honest effort, put your name on it, turn it in, and **PICK IT UP** after feedback has been given

While loops

Idea of while loops

```
while <condition>:
    <code>
```

Line 1

Line 2

Idea of while loops

```
while <condition>:
    <code>
```

Line 1

Line 2

1) Evaluate **<condition>** -> **True**

Line 1

Idea of while loops

```
while <condition>:
    <code>
```

Line 1

Line 2

1) Evaluate **<condition>** -> **True** — Line 1
2) Enter while loop and execute **<code>** — Line 2

Idea of while loops

```
while <condition>:
    <code>
```

Line 1
Line 2

1) Evaluate **<condition>** -> **True** — Line 1
2) Enter while loop and execute **<code>** — Line 2
3) Go back and evaluate **<condition>** -> **True** — Line 1

Idea of while loops

```
while <condition>:
    <code>
```

Line 1
Line 2

1) Evaluate **<condition>** -> **True** — Line 1
2) Enter while loop and execute **<code>** — Line 2
3) Go back and evaluate **<condition>** -> **True** — Line 1
4) Enter while loop and execute **<code>** — Line 2

Idea of while loops

```
while <condition>:
    <code>
```

Line 1
Line 2

1) Evaluate **<condition>** -> **True** — Line 1
2) Enter while loop and execute **<code>** — Line 2
3) Go back and evaluate **<condition>** -> **True** — Line 1
4) Enter while loop and execute **<code>** — Line 2
5) Go back and evaluate **<condition>** -> **True** — Line 1

Idea of while loops

```
while <condition>:
    <code>
```

Line 1
Line 2

1) Evaluate **<condition>** -> **True** — Line 1
2) Enter while loop and execute **<code>** — Line 2
3) Go back and evaluate **<condition>** -> **True** — Line 1
4) Enter while loop and execute **<code>** — Line 2
5) Go back and evaluate **<condition>** -> **True** — Line 1
6) Enter while loop and execute **<code>** — Line 2

Idea of while loops

```
while <condition>:
    <code>
```

Line 1
Line 2

1) Evaluate **<condition>** -> **True** — Line 1
2) Enter while loop and execute **<code>** — Line 2
3) Go back and evaluate **<condition>** -> **True** — Line 1
4) Enter while loop and execute **<code>** — Line 2
5) Go back and evaluate **<condition>** -> **True** — Line 1
6) Enter while loop and execute **<code>** — Line 2
7) Go back and evaluate **<condition>** -> **False** — Line 1

Idea of while loops

```
while <condition>:          Line 1
    <code>                  Line 2
```

1) Evaluate **<condition>** -> **True** — Line 1
2) Enter while loop and execute **<code>** — Line 2
3) Go back and evaluate **<condition>** -> **True** — Line 1
4) Enter while loop and execute **<code>** — Line 2
5) Go back and evaluate **<condition>** -> **True** — Line 1
6) Enter while loop and execute **<code>** — Line 2
7) Go back and evaluate **<condition>** -> **False** — Line 1
8) Skip over **<code>** inside while loop and move on — Line 3

Common types of while loops

```
while <condition>:
    <code>


<initialize x>
while x < 400:
    <do something that modifies x>


while <condition1> and <condition2>:
    <code>


while <condition1> or <condition2>:
    <code>
```

Impact of and/or on while loops

while A and B: **and**

print("both A and B are true")

A	B	A and B
True	True	**True**
True	False	False
False	True	False
False	False	False

Truth table

while A or B: **or**

print("either A is true, B is true, or both")

A	B	A or B
True	True	**True**
True	False	**True**
False	True	**True**
False	False	False

Truth table

Files

Assignments to review

- **Lab 5**: letter frequencies
- **Lab 7**: decoding hidden message
- **Lab 10**: comparing different species
- **Homework 5**: analyzing tweets from the Twitter file
- **Homework 8**: Smith College map digitization

Writing the file of coordinates

```
# write the (x,y) positions to a file
for point in building_lst:
    file.write(str(point.getX()) + " " + str(point.getY()) + " ")
file.write("\n")
```

Homework 8

```
def main():
    """Read a text file of coordinates and draw buildings. Each
    line of the text file is a separate building. The (x,y)
    coordinates are read one right after the other, in pairs.
    """

    # set up our graphics window
    width = 760
    height = 620
    win = GraphWin("Digital Map", width, height)

    # open the file of building coordinates
    file = open("buildings.txt", "r" )

    # read each line of the file (one building)
    for line in file:
        tokens = line.strip().split() # split the line

        # read in pairs to get (x,y) coordinates
        point_lst = []
        for i in range(0,len(tokens),2):
            p = Point(tokens[i], tokens[i+1])
            point_lst.append(p)

        # after building the list of points, create a Polygon
        p = Polygon(point_lst)
        p.setFill("lightgreen")
        p.draw(win)

    # close the file
    file.close()
```

Reading the file of coordinates

Dictionaries

Dictionaries

- Created using: {}

Dictionaries

- Created using: {}
- To add pairs right away: {0: “A”, 1: “B”}

Dictionaries

- Created using: {}
- To add pairs right away: {0: “A”, 1: “B”}
- Think about dictionaries like lists with a special index

Dictionaries

- Created using: {}
- To add pairs right away: {0: “A”, 1: “B”}
- Think about dictionaries like lists with a special index
- Special index is the “key” (unique), element at that key is the “value”

Dictionaries

- Created using: {}
- To add pairs right away: {0: “A”, 1: “B”}
- Think about dictionaries like lists with a special index
- Special index is the “key” (unique), element at that key is the “value”
- Unlike lists: not ordered

Dictionaries

- Created using: {}
- To add pairs right away: {0: “A”, 1: “B”}
- Think about dictionaries like lists with a special index
- Special index is the “key” (unique), element at that key is the “value”
- Unlike lists: not ordered
- Like lists: can get (lookup), set (assign, mutate)

Dictionaries

- Created using: {}
- To add pairs right away: {0: “A”, 1: “B”}
- Think about dictionaries like lists with a special index
- Special index is the “key” (unique), element at that key is the “value”
- Unlike lists: not ordered
- Like lists: can get (lookup), set (assign, mutate)
- To add more pairs later: dictionary[2] = “C”

Combine dictionaries, files, and while loops

Step 1: make the dictionary

- Find your random partner and introduce yourselves
- In main, write some code that will ask the user for their 99 number and their name (two questions)
- Use the first two and last two digits for speed and privacy
- Add the 99 number (key) and name (value) to a dictionary that will keep track of individuals using their 99 numbers

```
>>>
Enter your 99 number: 9995
Enter your name: Sara Mathieson
{9995: 'Sara Mathieson'}
>>>
```

Step 2: use a while loop

- Create a while loop that will keep asking for more 99 numbers and student names (use you and your partner's info)
- Create a way to stop the while loop (i.e. user enters -1 for their number or "stop" for their name)

```
>>>
Enter your 99 number: 9995
Enter your name: Sara Mathieson
Enter your 99 number: 9921
Enter your name: Alan Turing
Enter your 99 number: -1
{9921: 'Alan Turing', 9995: 'Sara Mathieson'}
>>>
```

Step 3: write dictionary data to a file

- After the while loop is over, write each number and name to a file using a loop over the keys of the dictionary