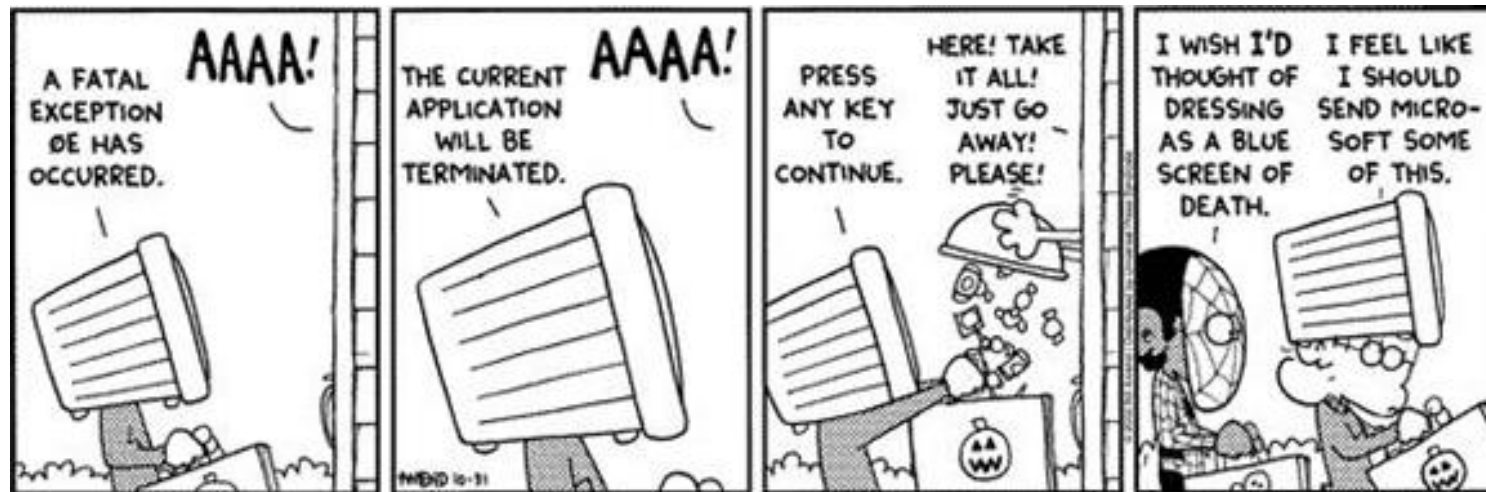


# CSc 110, Autumn 2017

## Lecture 18: While loops and File Input

Adapted from slides by Marty Stepp and Stuart Reges



# Programming Question

- Write a program that simulates rolling two 6-sided dice until their combined result comes up as 7.

2 + 4 = 6

3 + 5 = 8

5 + 6 = 11

1 + 1 = 2

4 + 3 = 7

You won after 5 tries!

# Programming Question

- Write a program that plays an adding game.
  - Ask user to solve random adding problems with 2-5 numbers.
  - The user gets 1 point for a correct answer, 0 for incorrect.
  - The program stops after 3 incorrect answers.

$$4 + 10 + 3 + 10 = \underline{27}$$

$$9 + 2 = \underline{11}$$

$$8 + 6 + 7 + 9 = \underline{25}$$

Wrong! The answer was 30

$$5 + 9 = \underline{13}$$

Wrong! The answer was 14

$$4 + 9 + 9 = \underline{22}$$

$$3 + 1 + 7 + 2 = \underline{13}$$

$$4 + 2 + 10 + 9 + 7 = \underline{42}$$

Wrong! The answer was 32

You earned 4 total points

# Answer

```
# Asks the user to do adding problems and scores them.
```

```
from random import *
```

```
def main():
```

```
    # play until user gets 3 wrong
```

```
    points = 0
```

```
    wrong = 0
```

```
    while wrong < 3:
```

```
        result = play()           # play one game
```

```
        if result == 0:
```

```
            wrong += 1
```

```
        else:
```

```
            points += 1
```

```
    print("You earned", points, "total points.")
```

# Answer 2

```
# Builds one addition problem and presents it to the user.
# Returns 1 point if you get it right, 0 if wrong.
def play():
    # print the operands being added, and sum them
    operands = random.randint(2, 5)
    sum = random.randint(1, 10)
    print(sum, end='')

    for i in range(2, operands + 1):
        n = random.randint(1, 10)
        sum += n
        print(" +", n, end='')
    print(" = ", end='')

    # read user's guess and report whether it was correct
    guess = input()
    if guess == sum:
        return 1
    else:
        print("Wrong! The answer was", total)
        return 0
```

# File Input/output (I/O)

- **name** = `open("filename")`
  - opens the given file for reading, and returns a file object
- **name.read()** - file's entire contents as a string

```
>>> f = open("hours.txt")
>>> f.read()
'123 Brett 12.5 8.1 7.6 3.2\n
456 Sarina 4.0 11.6 6.5 2.7 12\n
789 Nick 8.0 8.0 8.0 8.0 7.5\n'
```

# File paths

- **absolute path:** specifies a drive or a top "/" folder

`C:/Documents/smith/hw6/input/data.csv`

- Windows can also use backslashes to separate folders.

- **relative path:** does not specify any top-level folder

`names.dat`

`input/kinglear.txt`

- Assumed to be relative to the *current directory*:

```
file = open("data/readme.txt")
```

If our program is in  
open will look for

H:/hw6,

H:/hw6/data/readme.txt

# split

You can use the `split` function to break a file apart

- `str.split()` – splits a string on blank space
- `str.split(other_str)` – splits a string on occurrences of the other string

```
>>> f = open("hours.txt")
>>> text = f.read()
'1\n2\n45\n6\n'

>>> f = text.split()
['1', '2', '45', '6']
```



# Looping through a file

- The result of `split` can be used in a `for ... in` loop
- A template for reading files in Python:

```
file = open("filename")  
text = file.read()  
text = text.split()  
for line in text:  
    statements
```

# File input question

- We have a file `weather.txt`:

```
16.2  
23.5  
19.1  
7.4  
22.8  
18.5  
-1.8  
14.9
```

- Write a program that prints the change in temperature between each pair of neighboring days.

```
16.2 to 23.5, change = 7.3  
23.5 to 19.1, change = -4.4  
19.1 to 7.4, change = -11.7  
7.4 to 22.8, change = 15.4  
22.8 to 18.5, change = -4.3  
18.5 to -1.8, change = -20.3  
-1.8 to 14.9, change = 16.7
```

# File input answer

```
# Displays changes in temperature from data in an input file.
```

```
def main():  
    input = open("weather.txt")  
    lines = input.read().split()  
    prev = float(lines[0])          # fencepost  
  
    for i in range(1, len(lines)):  
        next = float(lines[i])  
        print(prev, "to", next, ", change =", (next - prev))  
        prev = next
```

# Gas prices question

- Write a program that reads a file `gasprices.txt`

- Format: *Belgium \$/gal*  
*US \$/gal*  
*date*

```
8.20
3.81
3/21/11
8.08
3.84
3/28/11
...
```

- The program should print the average gas price over all data in the file for both countries:

```
Belgium average: 8.3
USA average: 3.9
```

# Gas prices solution

```
def main():
    file = open("gasprices.txt")
    belgium = 0
    usa = 0
    count = 0
    lines = file.read().split()

    for i in range(0, len(lines), 3):
        belgium += float(lines[i])
        usa += float(lines[i + 1])

    print("Belgium average:", (belgium / count), "$/gal")
    print("USA average:", (usa / count), "$/gal")
```