COMP 141

General Procedure for Writing a While Loop

Rhodes College

Announcements

- Reminders
  - Program 4 due Tuesday, February 20th by 11:55pm

While Loop General Algorithm

```
while  some condition is true :
        # Do this code
        #Something here should modify the condition above
```

```
#ATM Machine - keeps asking for your PIN until
#you enter the right one
pin = int(input("What is your PIN? "))
while pin != 1234:
        print("Wrong PIN")
        pin = int(input("What is your PIN? "))
```

Practice From Last Time

Write a while loop that

- asks the user for 2 names
- compares the names
- outputs the name that comes first alphabetically.
- asks the user if they want to do it again at the end of the loop.
- keeps the loop going until the user replies ‘no’.

Modification as a class

Edit the previous loop so that the loop ends when the user enters ‘STOP’ for the first name. That is, the user no longer explicitly has to answer the question, ‘Do you want to keep going?’

You try

Write a loop to continuously ask the user for an integer from the keyboard. Stop looping only when they type in a number between 1 and 10.

Pseudocode

- an informal way of writing algorithms for humans to read (not computers!)
- Illustrates the logic of an algorithm, but omits details that people can fill in automatically.
- You get to make it up as you go along, as long as you (and other people) can easily understand it.

- Instead of saying

```
name = input(“What is your name? “)
```

- Pseudocode might use a line that says

```
name = ask user for name
```

- Instead of saying

```
if x >= 0 and x <= 100:
    print(“$%.2f” % x)
```

- Pseudocode might use a line that says

```
if x is between 0 and 100:
    print x with 2 decimal places
```

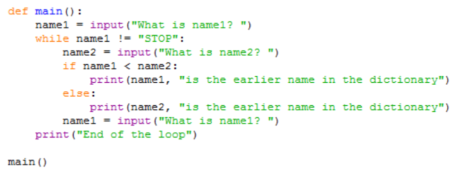
The point is to get your ideas down on paper quickly, so you can worry about the programming details and exact syntax later.

To write any while loop:

1. Write out pseudocode for what the loop does, explicitly repeating lines until you've repeated the code at least twice.
2. Include an "if" statement in your code that will be True if you want the loop to keep going.
3. Make sure the code repeats the "if" statement at least twice.
4. Find the statements between consecutive "if" statements. These statements will become the body of the loop.
5. The "if" test will become the "while" test.
6. If there's anything before the first "if" test, it will go immediately before the while loop (outside of the body).

Pseudocode for Name Comparison Program

```
name1 = ask for first name
if name1 is not STOP, then keep going
name2 = ask for second name
if name1 < name2, print out name1,
else print name2
name1 = ask for first name
if name1 is not STOP, then keep going
name2 = ask for second name
if name1 < name 2....blah blah blah
```



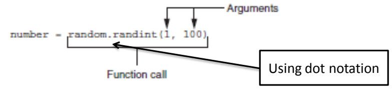
```
def main():
    name1 = input("What is name1? ")
    while name1 != "STOP":
        name2 = input("What is name2? ")
        if name1 < name2:
            print(name1, "is the earlier name in the dictionary")
        else:
            print(name2, "is the earlier name in the dictionary")
        name1 = input("What is name1? ")
    print("End of the loop")

main()
```

Generating Random Numbers

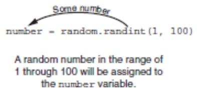
- Random number are useful in a lot of programming tasks
- <u>`random` module</u>: includes library functions for working with random numbers
- <u>`randint` function</u>: generates a random number in the range provided by the arguments

Figure 6-2 A statement that calls the `random` function



Generating Random Numbers

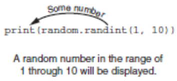
Figure 6-3 The `random` function returns a value



```
number = random.randint(1, 100)
```

A random number in the range of
1 through 100 will be assigned to
the `number` variable.

Figure 6-4 Displaying a random number



```
print(random.randint(1, 10))
```

A random number in the range of
1 through 10 will be displayed.

Using Random Numbers Example

```
# This program displays a random number
# in the range of 1 through 10.
import random

def main():
    # Get a random number.
    number = random.randint(1, 10)
    # Display the number.
    print('The number is', number)

# Call the main function.
main()
```

Pseudocode for Guess the Number Game

```
number = generate a random number between 1 and 100
guess = ask user to guess a number between 1 and 100
if number does not equal guess, then keep going
if guess is greater than number, tell user this
else if guess is less than number, tell user this
guess = ask user to guess a number between 0 and 100
if number does not equal guess, then keep going
if guess is greater than number, tell user this
else if guess is less than number, tell user this
guess = ask user to guess a number between 0 and 100
if number does not equal guess, then keep going
if guess is greater than number, tell user this
else if guess is less than number, tell user this
. . .
When user guesses correct number, tell them so
```

Sample Output

```
Guess a number between 1 and 100: 50
Your guess was too high.
Please try again: 40
Your guess was too high.
Please try again: 30
Your guess was too low.
Please try again: 35
You guessed right! Great work!
```