

Python challenges using strings

Challenge: Using strings at the interactive prompt:

- Make a variable myStr and assign the string "Winter Olympics 2014"
- Use string slicing to display "Winter"
- Use string slicing to display "2014"
- Use string slicing to display the last character in the string.
- What is the length of the string?
- Does the string contain alphanumeric characters?
- Does the string contain any digits?
- Is the string all lowercase letters?
- At what index does the "2" occur?
- Does the string contain the string "er"?
- Replace all the occurrences of the string "i" with the string "xxxx".

Challenge 1: What does this code do?

```
word = "Jackson"
for letter in word:
    print(letter)
```

Challenge 2: Write a program that will input a string from the user. Print out the length of the string and the first and last letter of the string.

Challenge 3 : Write a program that asks the user to enter a string and then just display the characters that are lower case letters one per line.

Challenge 4: Create the string "MonTueWedThuFriSatSun"

Write a program that lists the 3 letter code for each day, one per line.

Challenge 5: Cipher challenge

This program uses ord() and chr() functions to write a simple Caesar cipher. ord() returns the number for an ASCII character and chr() returns the ASCII character given the number

Enter this program.

Write the program to decrypt the cipher.

```
# encrypt a caesar cipher
myString=input("Enter string to be encrypted")
encryptString=""

for character in myString:
    number=ord(character)
    encNumber = number + 1
    encryptString=encryptString + chr(encNumber)
print(encryptString)
```

Challenge using random number

Write a program that selects a random number between 0 and 10. It then asks the user to guess their number. If they are correct it says "Well done – you guessed the correct number". Else it says "Wrong answer".

Challenge using while loops

Re-write your answer to the question above using a while loop so the program keeps asking the user to enter their "guess" until it is correct.

Extension: Include a scoring system to count the number of "guesses".

Extension: Ask the user to guess a random number between 0 and 100. To help the player the program should display whether the number they have guessed is greater than or less than the answer.

Hint: Use the if command

Challenge using while loops

```
answer = input("Enter password ")
if answer == "friend":
    print("Access granted")
else:
    print("Access denied")
```

This program checks to see if the user has entered the correct password. Add a while command that loops **repeatedly** prompting for the password while an incorrect password is entered.

When the correct password is entered the program displays "Access granted". What is the condition to test?

Challenge using while loops

Write a "count down" program which counts down from 10 to 1 and then displays "Lift off". The outline of the program is given below with parts missing.

What is the guard variable?
What is the condition is being tested?
Where is the guard variable changed?

```
count = 
while count  0:
    print(count)
     = count - 1
print("Lift off!")
```

Challenge using while loops

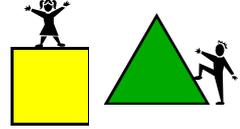
A Fibonacci number is a series of numbers in which each number is the sum of the two preceding numbers. Write a program to calculate the first 20 Fibonacci numbers.

Hint: You need 3 variables (numberOne, numberTwo and numberThree) and numberThree=numberOne + numberTwo.

Extension:

Explore the while command further.....

http://en.wikibooks.org/wiki/Non-Programmer%27s_Tutorial_for_Python_3/Print_version#While_loops



Writing your own functions in Python

Programs can be divided into smaller parts called functions to make them easier to write and understand. You have already been using Python functions such as `print()`, `input()` and `random()`. You are going to write your own functions.

Functions have a name, brackets to pass parameters into the function () and a colon. The commands must be indented.

```
def function_name():
    commands
    commands
```

You are going to write a program which calculates the area of a shape.

The program will ask which shape to calculate the area for and then ask the user to enter the size(s) of the shape. The program will then calculate and display the area. Part of this program has been written.

Open the Python program **area.py** and copy into your folder. Look at the code. Find the **main()** function. This function runs all the other functions. How does it work?

```
def main():
    print("Welcome - this program calculates the area of shapes")
    print("Please select the shape from the list")
    print("1 Circle")
    print("2 Square")
    print("3 Rectangle")
    answer = input("Please enter number 1,2 or 3 to select type of shape")
    if answer == "1":
        circle()
    if answer == "2":
        square()
    if answer == "3":
        rectangle()
```

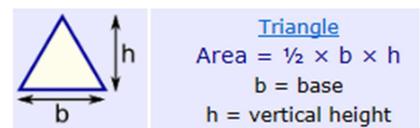
Run the **area.py** program. Enter **main()** in the shell prompt to start the program. Select the circle (1). Enter a number for the radius and check the program calculates the area correctly for the circle.

```
def circle():
    # function to calculate the area of a circle = pi * (radius) squared
    import math
    radius=float(input("Please enter radius of circle "))
    print(math.pi)
    area = math.pi * (radius*radius)
    print ("Area of a circle with radius of",radius,"is ",area)
```

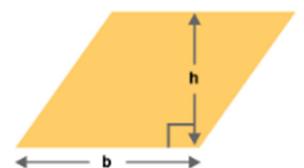
Challenge 1: Write a function to ask the user to enter the length of one side of the square and then calculates the area of a square. (Area of a square = side * side)

Challenge 2: Write a function to ask the user to enter the width and height of a rectangle and then calculate the area of the rectangle (Area of a rectangle = width * height)

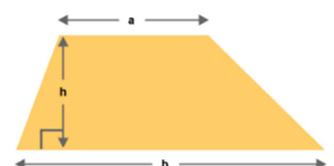
Challenge 3: Write a function to ask the user to enter the base and height of a triangle and then calculate the area of a triangle. You will need to add more lines to the `main()` function to allow the user to select the triangle function.



The area of a parallelogram is $b \times h$



The area of a trapezium is $\frac{1}{2} \times h \times (a + b)$



Extension task: Add functions to calculate:

- Area of a parallelogram (area of parallelogram = base * height)
- Area of a trapezium (area of trapezium = $(1/2) * height * (a + b)$)
- Perimeter of a square, square, rectangle
- Improve the menu so the user can select letters rather than numbers

Round is inbuilt function which rounds a value to a number of decimal places. `Round(answer,2)` will display the value assigned answer to 2 decimal places.

Controlling the web browser from Python



Importing the webbrowser module allows you to display web documents using a Python program.

```
import webbrowser
```

<code>webbrowser.open(URL)</code>	opens the URL(uniform resource locator) in the browser.
<code>Webbrowser.open_new_tab</code>	opens the URL in a new tab in the browser

Open the program **webprogram.py** and look at the code.

```
import webbrowser

website1="http://www.bbc.co.uk/sport/0/"
website2="http://www.bbc.co.uk/cbbc/"
website3="http://www.bbc.co.uk/nature/"

print("Which website would you like to visit?")
print("1 to open sport")
print("2 to open cbbc")
print("3 to open nature")

answer = input("Please enter your choice of site: ")

if answer == "1":
    webbrowser.open_new_tab(website1)
if answer == "2":
    webbrowser.open_new_tab(website2)
if answer == "3":
    webbrowser.open_new_tab(website3)
```

Import the module

Challenge 1: Amend the code to run three websites of your choice.

Hint: Goto the webpage in a web browser and copy and paste the **full** URL from the address bar.

Challenge 2: Amend the code to allow the user to select from **five** choices of webpages.

Challenge 3: Amend the code to include a while loop that asks if they want to open another page and enter Y to continue and N to quit. Hint: Use a variable and set it to "Y" before you start the while loop