

CPSC 203

Problem Solving

Week 2 Lab1

Loops and Conditions

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Review

- Define a function

```
def functionName():
```

- Define a variable

```
x=10
```

```
myName="Dina"
```

- Display a variable

```
print x
```

- Display a constant

```
print "Hello"
```

Review

- Display a constant and a variable
`print “My name is :”, myName`
- To execute a function, type in the black box
`functionName()`

Review

- Make a function called Square that:
 1. Sets the length of the square to be 6
 2. Calculates the Area of the square ($\text{length} * \text{length}$)
 3. Calculates the perimeter of the square ($4 * \text{length}$)
 4. Displays a message
 - For a Square with length, area=, Perimeter=....

Solution

```
def Square():  
    length=6  
    area=length*length  
    Perimeter=4*length  
    print "For Square with length", length , "Area=", area,  
        "Perimeter=", Perimeter
```

- What if I want the user to enter the length of the square?

```
def Square(length):
```

```
    area=length*length
```

```
    Perimeter=4*length
```

Now, you can call your function with multiple lengths such as: Square(7), Square(8.5), etc...

This is called **Parameter Passing**

Note: For passing a string, you should use **quotes** e.g.

```
def printName(myName):
```

```
    print myName.
```

This function is called using: printName(“Dina”)

Exercise

- Make a function called myCircle that:

1. Define r as 10.5
2. Define pi as 3.14
3. Calculate the area of the circle (A) as $\pi * r * r$
4. Calculate the perimeter of the circle (P) as $2 * \pi * r$
5. Print the following message

“For a circle with radius ..., area=... and perimeter=....”

You should replaced the dots before with the radius, calculated area, and calculated perimeter

6. Use parameter passing concept to enable the user to pass the values of r and pi

If-else condition

if test1:

statements1

elif test2:

statements2

else:

statements3

IMP:

- For equal test, you must use “== “e.g. if x==y

Example

- Make a function that compares two numbers x , y and prints “Equal” if $x=y$, “larger” if $x>y$, and “smaller” if $x<y$.
- Try testing using `compare(6,7)`, `compare(7,9)`, `compare(0,0)`

```
def compare(x,y):  
    if x==y:  
        print "Equal"  
    elif x>y:  
        print "Larger"  
    else:  
        print "Smaller"
```

Exercise

- Modify your square function to check first if the length is greater than 0. In case that, it is less than or equal 0, your function should print an error message and it shouldn't calculate the area or the perimeter.

Answer

```
def square(length):  
    if length<=0:  
        print "Error, length should be greater than 0"  
    else:  
        area=length*length  
        perimeter=4*length  
        print "For a Square with length ", length, "Area=", area,  
        "Perimeter=", perimeter
```

- Now, modify `myCircle()` function to check for the radius and pi values and ensure that they are greater than 0.

LOOPS

- If I have an array (10,20,30,40,50)
 - How to sum these numbers?

```
def myLoop():  
    Sum = 0  
    for x in [10,20,30,40,50]:  
        Sum = Sum + x  
    print Sum
```

Sum	0	10	30
x	10	20	2

Loops

for target in object (:)
statements

IMP:

Every statement indented after the loop is executed in every iteration of the loop

Example

- Modify the previous program to print the sum of each iteration in the loop

```
def myLoop():  
    Sum = 0  
    for x in [10,20,30,40,50]:  
        Sum = Sum + x  
        print "Current x:", x  
        print "Current Sum:", Sum  
    print "Finished"
```

While Loop

```
while condition-is-true :  
    statements
```

Example:

```
def function whileLOOP():
```

```
    x=5
```

```
    while x>0:
```

```
        print x*x
```

```
        x=x-1
```

```
x=5    → 25
```

```
x=4    → 16
```

```
x=3    → 9
```

```
x=2    → 4
```

```
x=1    → 1
```

```
x=0    STOP
```

Try removing x=x-1

Notes:

- $x=x+1 \rightarrow x+=1$
- $x=x-1 \rightarrow x-=1$
- $x=x*2 \rightarrow x*=2$
- $x=x/10 \rightarrow x/=10$