

CPSC 203

Problem Solving

Week 2 Lab1

Loops and Conditions

Dina A. Said
dasaid@ucalgary.ca

Review

- Define a function
`def functionName():`
- Define a variable
`x=10`
`myName="Dina"`
- Display a variable
`print x`
- Display a constant
`print "Hello"`

2/11/2009

CPSC203-Problem Solving-Week2- Lab1

2

Review

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

2/11/2009

CPSC203-Problem Solving-Week2- Lab1

3

Review

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

2/11/2009

CPSC203-Problem Solving-Week2- Lab1

4

Solution

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

2/11/2009

CPSC209-Problem Solving-Week2- Lab1

5

- 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")

2/11/2009

CPSC209-Problem Solving-Week2- Lab1

6

Exercise

- Make a function called myCircle that:
 - Define r as 10.5
 - Define pi as 3.14
 - Calculate the area of the circle (A) as $\pi * r * r$
 - Calculate the perimeter of the circle (P) as $2 * \pi * r$
 - Print the following message
 "For a circle with radius ..., area=... and perimeter=..."
You should replace the dots before with the radius, calculated area, and calculated perimeter
 - Use parameter passing concept to enable the user to pass the values of r and pi

2/11/2009

CPSC209-Problem Solving-Week2- Lab1

7

If-else condition

```
if test1:
    statements1
elif test2:
    statements2
else:
    statements3
```

IMP:

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

2/11/2009

CPSC209-Problem Solving-Week2- Lab1

8

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"
```

2/11/2009

CPS203-Problem Solving-Week2- Lab1

9

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.

2/11/2009

CPS203-Problem Solving-Week2- Lab1

10

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
```

2/11/2009

CPS203-Problem Solving-Week2- Lab1

11

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

2/11/2009

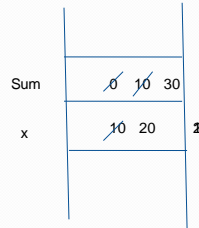
CPS203-Problem Solving-Week2- Lab1

12

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
```



2/11/2009

CPSC209-Problem Solving-Week2- Lab1

13

Loops

for target in object :
statements

IMP:

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

2/11/2009

CPSC209-Problem Solving-Week2- Lab1

14

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"
```

2/11/2009

CPSC209-Problem Solving-Week2- Lab1

15

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

2/11/2009

CPSC209-Problem Solving-Week2- Lab1

16

Notes:

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