

CPSC 203 Problem Solving

Week 2 Lab2
Loops and Conditions
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If-else condition

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

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Operators

- == equal
- != not equal
- < less than
- <= less than or equal
- > greater than
- >= greater than or equal
- and
- or
- not

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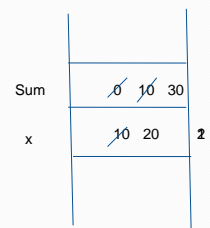
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LOOPS

- 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
```



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Loops

for target in object ☹
statements

IMP:

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

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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"
```

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Using range

- range(start, end+1) → default is inc=1
- range(start, end+1, inc/dec)

- Example 1

```
def looping2():
    for x in range(6,16):
        print x
```

6	6
7	8
8	10
9	12
10	14
11	

- Example 2

```
def looping3():
    for x in range(6,16,2):
        print x
```

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13
14
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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

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Notes:

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

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More on Functions

- Define **return** value \rightarrow this value will be displayed in the black box when you call the function
- Example, a function that takes two numbers and returns the largest

```
def Max(x , y):
    if x>y :
        return x
    else
        return y
```

Test your program with
 Max(10,5)
 Max(0,6)
 Max(7,7)

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Accepting Input from User

- Using function **raw_input('message')**
- Example:


```
def printNameID():
    name=raw_input("What is your name?")
    ID= raw_input("What is your ID?")
    print name, ID
```

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- The function **raw_input()** returns a string. To transfer it to integer, use the function **int()**
- Example:

```
def grades():
    myGradeStr=raw_input("What is the grade?")
    myGrade=int(myGradeStr)
    if myGrade >= 90:
        return "A"
    else:
        return "B"
```

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Print all elements in list

```
def printList(S):
    for i in S:
        print i
    print "Length of the array is:", len(S)
    print "First element is: ", S[0]
    print "Last element is:", S[ len(S) -1]
```

Test your program with
`printList((10,20,-10,80))`
`printList()`
`printList()`

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`len(S) = 4`
 First element is 9 `S[0]`
 Second element is 7 `S[1]`
 Last element is 3 `S[len(S) -1]`

S[0]	9
S[1]	7
S[2]	15
S[3]	3

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```
def printList2(S):
    if len(S)==0:
        return "Empty"
    for i in range(0,len(S)):
        print "Element with index ", i, "=", S[i]
```

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Define a function empty(S)

```
def empty(S):
    return len(S) == 0
```

- Returns the result of the checking if `len(S)==0`

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Get the summation of a list

```
def sumOfList(S):
    if empty(S):
        return "Empty"
    sum=0
    for i in S:
        sum=sum+i
    return sum
```

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Get the multiplication of a list

```
def mulOfList(S):
    if empty(S):
        return "Empty"
    mul=1
    for i in S:
        mul= mul *i
    return mul
```

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Check for Even and odd

- Using mod function (%)
 - $5 / 2 = 2 \frac{1}{2}$
 - $6 / 2 = 3 \ 0$
 - $7 / 2 = 3 \frac{1}{2}$
- $\text{EvenNumbers} \% 2 = 0$
- $\text{OddNumbers} \% 2 = 1$
- The same concept:
 - $\text{MultipliersOf3} \% 3 = 0$
 - $\text{NotMultiplierOf3} \% 3 \neq 0$
 - $\text{MultipliersOf4} \% 4 = 0$

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Check a list for even and odd

```
def printEven(S):
    if empty(S):
        return "Empty"
    for i in S:
        if i%2==0:
            print i, " is even"
        else:
            print i, " is odd"
```

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Exercise

- Make a program to find the summation of odd elements in a list S
- Make a program to find the multiplication of elements in a list S which are multipliers of 3 and odd

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Find the Min element in a list

```
def getMin(S):
    if len(S)==0:
        return "Empty"
    min_so_far=S[0]
    for i in range(1, len(S)):
        if S[i] < min_so_far:
            min_so_far = S[i]
    return min_so_far
```

S[0]	9	Min=S[0]=9
S[1]	7	Is S[1] < min? Min=7
S[2]	15	Is S[2] < min? Min=7
S[3]	3	Is S[3] < min? Min=3

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Find the Max in a list

```
def getMax(S):
    if len(S)==0:
        return "Empty"
    max_so_far=S[0]
    for i in range(1, len(S)):
        if S[i] > max_so_far:
            max_so_far = S[i]
    return max_so_far
```

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