C S C 1 0 6 1 F i n a l E x a m 29 Jan. 2016

Name: **ID No.:**

1. (20 points) Write the output of the following python program on the space provided.

```
def test(L):
    for k in range(len(L)-1):
        for i in range(k+1,len(L)):
            if L[i] > L[k]:
                L[k],L[i]=L[i],L[k]
        print k+1, ": ", L
    return L

lst=[30,20,50,40,80,70]
print "Before test:"
print lst
print "After test:"
print test(lst)
```

```
### program output

Before test:
[30, 20, 50, 40, 80, 70]
After test:
1 :  [80, 20, 30, 40, 50, 70]
2 :  [80, 70, 20, 30, 40, 50]
3 :  [80, 70, 50, 20, 30, 40]
4 :  [80, 70, 50, 40, 20, 30]
5 :  [80, 70, 50, 40, 30, 20]
[80, 70, 50, 40, 30, 20]
```

---

for k in range (6-1) → k = 0, 1, 2, 3, 4

for I in range(k+1, 6): → k=0, i = 1, 2, 3, 4, 5

k=1, I = 2, 3, 4, 5

k=2, I = 3, 4, 5

k=3, I = 4, 5

k=4, I = 5

0 1 2 3 4 5

L= [30, 20, 50, 40, 80, 70]

k	i	L[k]	L[i]	if (L[i] > L[k]):		
0	1	30	20	False		L= 30, 20, 50, 40, 80, 70
	2	30	50	True	-- change	L= 50, 20, 30, 40, 80, 70
	3	50	40	False		
	4	50	80	True	-- change	L= 80, 20, 30, 40, 50, 70
	5	80	70	False		L= 80, 20, 30, 40, 50, 70
						1: [80, 20, 30, 40, 50, 70]
1	2					
	3					
	4					

Name: ID No.:

2. (20 points) The following program prints data for testing local and global variables. Write the output in the sequence when the following program is executed:

```
### program for variable testing
def test():
    a =  101
    print "test: ", a

def swap(a,b):
    a, b = b, a
    print "swab: ", a, b
print "### program output"

x, y = 33, 555
print "main 1: ",  x, y
swap(x, y)
print "main 2: ",  x, y
a=  100
print "main 3: ", a
test()
```

```
### program output

main 1:  33 555
swab:  555 33
main 2:  33 555
main 3:  100
test:  101
main 4:  100
```

3. (10 points) What is the output of the following program

```
### program code
st="hello students"
st1="I love python"

print  st[2:6]

print  st1[:]

print  "lo" in st1
```

```
### program output
llo
I love python
True
```

Name: ID No.:

4. (30 points) The following list contains age of 10 students.

Age = [19,20,19,21,20,21,19,18,20,20]

Frequency = { }

Write a python program to put distinct ages as a key and their frequency (count) as a value into the Frequency dictionary and then generate a column chart showing the age and its frequency as shown below.

18 *
19 * * *
20 * * * *
21 * *

```
### your program code
Age = [19, 20, 19, 21, 20, 21, 19, 18, 20, 20]
Frequency = { }

for   I in   Age :
       Frequency[I] = Frequency.get(I, 0) +1
keys= Frequency.keys()
values= Frequency.values()
for i in keys:
      print i,   " *" * Frequency.get(i,0)
```

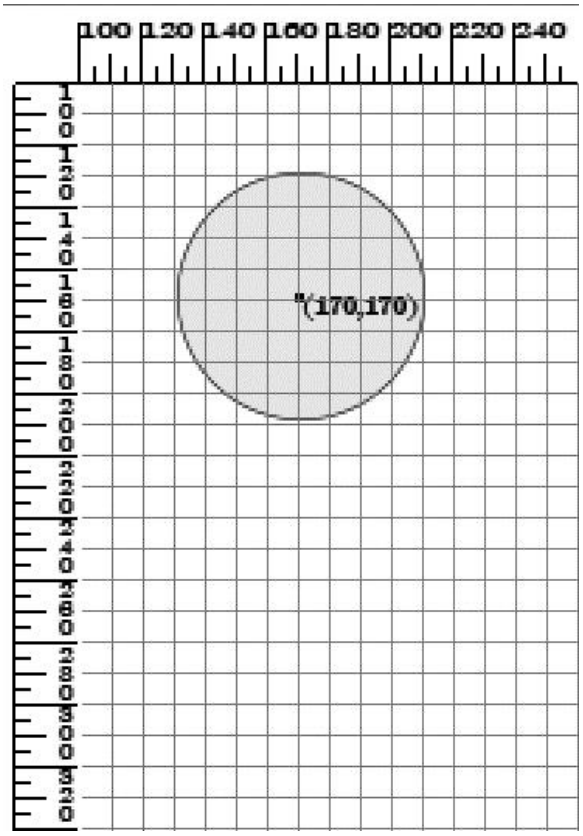
```
letterCounts = {}          # 10.7 Counting letters, p111
for letter in "Mississippi":
   lletterCounts[letter] = letterCounts.get (letter, 0) + 1
**********************************************************************
Age = [19, 20, 19, 21, 20, 21, 19, 18, 20, 20]
Frequency = { }
for   I in   Age :
       Frequency[I] = Frequency.get(I, 0) +1
Print Frequency
keys=Frequency.keys()
values=Frequency.values()
for i in keys:
      print   int(i), " *" * Frequency.get(i,0)
```

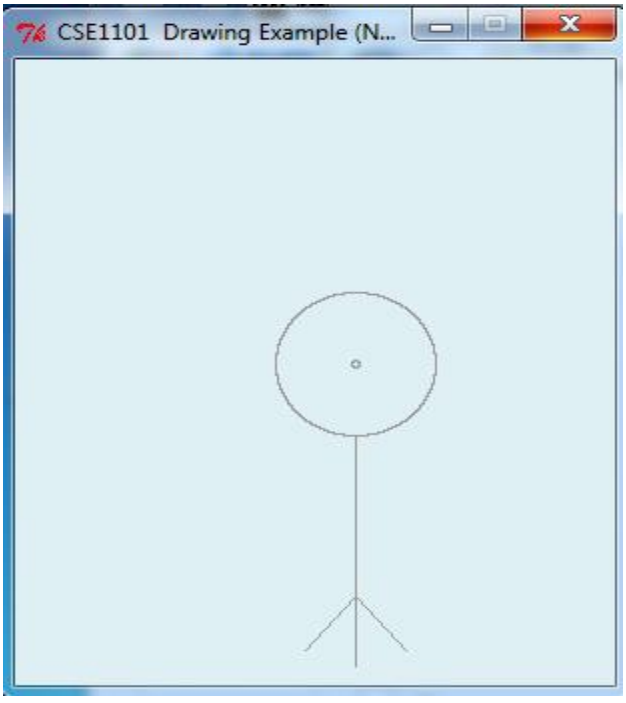
Name: ID No.:

5. (20 points) Draw Graphics

In this part you will find a python program together with a canvas. You are required to draw the output of the program on the canvas. Some part of the output is already drawn for you. The center point of the circle is at (170,170). Do it **neatly** and make sure to label all the **necessary** points on the canvas.

```
from cs1graphics import *
paper=Canvas(300,350)
def draw_face_body():
    face=Circle(40,Point(170,170))
    body=Path(Point(170,210),Point(170,300))
    paper.add(face)
    paper.add(body)
def draw_leg():
    leg=Path(Point(170,300),Point(170,340))
    return leg
theleg=draw_leg()
leftleg=theleg.clone()
rightleg=theleg.clone()
leftleg.rotate(40)
rightleg.rotate(-40)
paper.add(theleg)
paper.add(leftleg)
paper.add(rightleg)
draw_face_body()
draw_leg()
```





Name: **ID No.:**

6. (bonus: 20 points) Program Writing

Suppose that there is a list which contains the id number, mid and final marks of four students. The program uses a dictionary, where **the key** is the ID of the student and **value** is a list containing the mid and final result of student, like this **{"R/001/05": [35, 50],"R/009/05": [27, 33],...}.** Partial code is given, so you are required to complete the given program.

ID	Mid (40%)	Final (60%)
R/001/05	35	50
R/009/05	27	33
R/112/06	39	55
R/114/05	20	25

A. Calculate the total marks of each student and append them to your original lists inside the dictionary:
Similar to {"R/001/05": [35, 50, 85], "R/009/05": [27, 33, 60],...}

B. Print the dictionary in the following format

Students List

ID	Mid_Marks	Final_Marks	Total
R/114/05	20	25	45
R/112/05	39	55	94
R/001/05	35	50	85
R/009/06	27	33	60

Program Code:

```
def create_dictionary():
    ids = ["R/001/05", "R/009/06", "R/112/05" ,"R/114/05"]
    results= [[35,50], [27,33], [39,55], [20,25]]
    students = dict()
    for i in range(len(ids)):
        students[ids[i]]=results[i]
    return students
```

```
def append_total(students):
```

```
def print_dictionary(students):
```

```
# Main Program
students=create_dictionary( )
students=append_total(students)
print_dictionary(students)
```