IB Computer Science **Name** :_____(3 points)

Exam 2

1) Write the output of the following programs. (10 points each) a.

```
a=[0,1]
for i in range(1,5):
      a=a+[a[i]+a[i-1]]
print a
>>> [0, 1, 1, 2, 3, 5]
```

b.

```
a=[]
for i in range(4):
    b=[]
    for x in range(3):
        b=b+[i+2*x]
    a=a+[b]
print a
>>> [[0, 2, 4], [1, 3, 5], [2, 4, 6], [3, 5, 7]]
```

c.

```
a=[1,3,4,2,8]
b=[]
for i in range(len(a)-1):
    b=b+[a[i+1]-a[i]]
print b
>>> [2, 1, -2, 6]
```

2) Write the output of the following programs. (10 points each)

a. Write a program that prints the sum of 100 random number between 0 and 1.

```
import random
s=0
for x in range(100):
    s = s + random.uniform(0, 1)
print s
```

b. Write a program that prints the average value of an array "a".

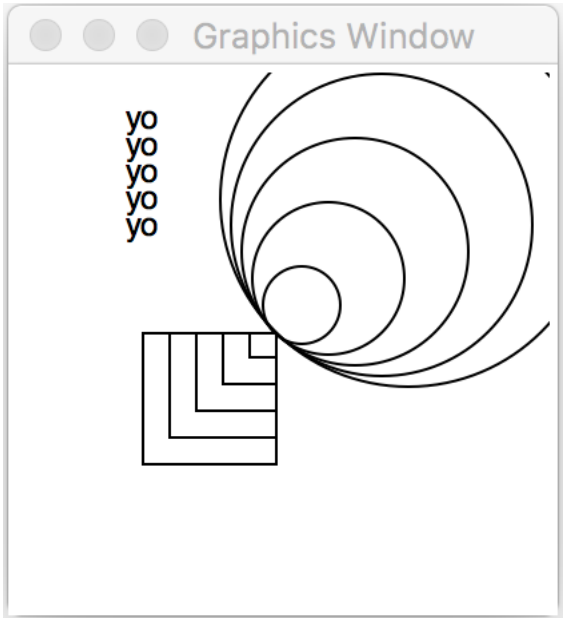
```
a=[1,2,3]
s=0

for x in range(3):
    s = s+a[x]

print s/(len(a))
```

c. Write a program that builds a 10 by 10 checkerboard array of ones and zeros.

```
 import random
a=[]
s=0


for x in range(10):
      b=[]
      for y in range(10):
            if s==0:
                  s=1


            else:
                  s=0


            b.append(s)
      a.append(b)


for i in range(len(a)):
      print a[i]
```

3) Draw the output of the following program. (20 points)

```
from graphics import *


win=GraphWin()
win.setCoords(-10,-10,10,10)


for i in range(1,6):
    circ=Circle(Point(i,i),(2**0.5) * i)
    rec=Rectangle(Point(-i,-i),Point(0,0))
    t = Text(Point(-5,9-i), "yo")
    circ.draw(win)
    rec.draw(win)
    t.draw(win)
```



4) Perform the following conversions. (10 points each)

a. Convert the Base5 number 432 to Base10.

```
4 * 25 = 100
+ 3 * 5 = 15
+ 2 * 1 = 2
>>> 117.
```

b. Convert the binary number 1010001 to Base10.

```
>>>81
```

c. Convert the Base10 number 532 to Base5.

```
>>> 41125
```