Lecture 8 Lab Exercises

Try to finish as much as you can in class. If you are stuck, discuss with your neighbors, discuss with TA and me. You can refer to all the class notes. But try not to look for answers on the Internet.

1. Define a function and compute the largest number among 3 numbers and ask the user for 3 input numbers and output the largest one.

```
def max_of_three(x,y,z):
    return []
```

2. Write a function that judge whether a number is even. Ask the user for a number, and print out whether it is even or odd.
```
def isEven(x):
```

3.   Write a function that generates a top of a box.
```
def top():
    print ('****************')
```

   Then write a second function to draw the side of the box.
```
def side():
    print[]
```

   Ask the user of how tall the box should be and print the box accordingly by calling the above functions. For example, the following is an example output:

```
>>>
How tall? 5
**********
*        *
*        *
*        *
*        *
*        *
**********
```

4. A manufacturing company measured the productivity of its workers and found that between the hours of 6am and 10am they could produce 30 pieces/hour/worker; between 10am and 2pm they could produce 40 pieces/hour/worker; and between 2pm and 6pm they could produce 35 pieces/hour/worker. Develop a function 'production' that takes an hour of the day between 6am and 6pm, in twenty-four hour format, along with the number of workers and computes the total number of pieces produced during that hour.

5. Develop the function inside_circle, which consumes three numbers representing the x and y coordinates of a point and the radius r of a circle centered around the origin. It returns true if the point is within or on the circle. It returns false otherwise. The distance of the point to the origin is the square root of $x^2 + y^2$. HINT: import math

6. Imagine the owner of a movie theater who has complete freedom in setting ticket prices. The more he charges, the fewer the people who can afford tickets. In a recent experiment, the owner determined a precise relationship between the price of a ticket and the average attendance. At price $5.00, 120 people attend a performance. Decreasing the price by a dime ($0.1) increases attendance by 15. Unfortunately, every performance costs the owner $180. Each attendee costs another four cents ($0.04). The owner would like to know the exact relationship between profit and the ticket price so that he can determine the price at which he make the highest profit. The owner can enter a price (can be a float number) and return an estimated profit.

There are two ways to solve the problem. One is to extract all the math and write one function:
Def profit (price)
     return …. Long equation.

Another way is to construct a few smaller functions. For example:

def profit(price)
      return revenue(price)- cost(price)

def revenue(price)
      ….
def cost(price)
   …..

def attendees(price)
    return 120+ (5-price) *(15/0.1)

7 (Extra). Imagine you are in standing at a cross road, before you there is a cave and a castle. Ask the user which one he/she wants to enter. If they enter the cave, asked them if they want to poke the dragon, if the answer is "yes", they die, if the answer is "no", they live. If, on the other hand, they want to go to the castle, tell them they will have a good night of sleep or show them with a nice pattern of stars (e.g. a diamond shape of stars). Please use the following functions in your code. Be creative of what you reward the user.
def castle():
   print….
def cave():
   print….
def die():

def live():