Fall 2020 COP 2930 Midterm Exam Part B Solutions

Date: 10/8/2020
Time Given: 11:00 am
Time Due: 11:45 am
Late Due Time: 11:55 am

1) (12 pts) A candy machine produces 1 piece of candy on day 1, 3 pieces of candy on day 2, 5 pieces of candy on day 3, and so on. On each subsequent day, the machine produces 2 more pieces of candy than the previous day. Write a program that prompts the user for how many days they want to run the machines, storing this value in a variable called `numDays` and prints out a chart of the total number of candies that have been produced after each day. The chart header and the first 3 lines of the chart should look like this:

```
Day   Total Candy
1     1
2     4
3     9
```

For each line, please place a single tab ('\t') between the two items printed.

Sample Solution
```
numDays = int(input("How many days to run the candy machine?\n"))

for day in range(1, numDays+1):
    print(day, day*day, sep = "\t")
```

Grading: 4 pts for input(1 pt LHS=, 1 pt int, 1 pt input, 1 pt prompt)
0 pts chart header (ok if they forgot this, not what I am testing)
4 pts loop (1 pt for, 1 pt index, 2 pts for range)
4 pts print(1 pt day, 2 pts day**2, 1 pt tab separation)

2) (20 pts) Consider printing out sections of a highway in text using just the equal sign('=') and the star character ('*'). The drawing below has three lanes and each lane is 8 characters long. Write a program that asks the user to enter the length of the highway in characters as well as the number of desired lanes, and prints the appropriate design. **Please do NOT use Python's feature of multiplying a string by a number.** Instead, please write your program using nested loops in some fashion where each individual print statement prints at most one character. *Minimal credit will be given for solutions that are correct but don't adhere to these directions!*

```
========
* * * * * * * *
========
* * * * * * * *
========
* * * * * * * *
========
```

```
length  =  int(input("What  is  the  length  of  the  highway  in
characters\n"))
lanes = int(input("How many lanes is the highway?\n"))

for i in range(length):
    print("=", end="")
print()

for i in range(lanes):

    for j in range(length):
        print("*", end="")
    print()

    for j in range(length):
        print("=", end="")
    print()
```

Grading: 2 pts length input, 2 pts lanes input, 4 pts for printing first or last set of =s. 4 pts loop, 4 pts print *s, 4 pts print =s

3) (15 pts) For this question, use the Python Turtle to draw one lane of a highway. The highway should look horizontal to the viewer with two horizontal lines 100 pixels apart indicating the edges of the lane. One of these line segments should go from (-300, 50) to (250, 50) and the other should go from (-300, -50) to (250, -50). In the middle, there should be a dotted line which is drawn by drawing a line segment of length 50 followed by moving 50 pixels without drawing and alternating that behavior starting at x = -300 and ending at x = 250. Specifically, the picture should look something like this

———————————————————————————

——   ——   ——   ——   ——   ——

———————————————————————————
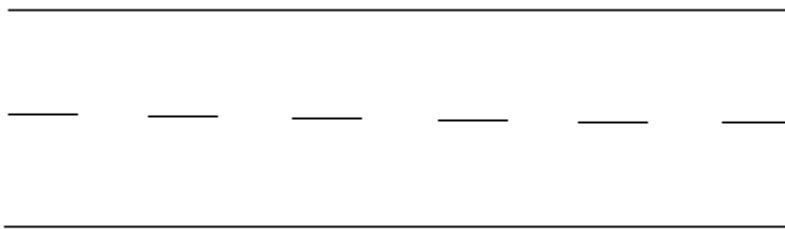
DO NOT HARD CODE SEPARATE forward statements to draw each of the six middle line segments! Please use a single loop with either one or two forward statements to draw those six middle line segments. *Minimal credit will be given for solutions that are correct but don't adhere to these directions!*

```
# Draw top line.
turtle.penup()
turtle.setpos(-300, 50)
turtle.pendown()
turtle.forward(550)

# Draw bottom line.
turtle.penup()
turtle.setpos(-300, -50)
turtle.pendown()
turtle.forward(550)

# Get ready for middle line.
turtle.penup()
turtle.setpos(-300, 0)
```

 # PLACE YOUR CODE HERE TO DRAW THE 6 middle segments.
```
for i in range(11):

    if i%2 == 0:
        turtle.pendown()
    else:
        turtle.penup()
    turtle.forward(50)
```

<u>Alternate Solution</u>
```
for i in range(6):

    # First we draw.
    turtle.pendown()
    turtle.forward(50)

    # Then we move w/o drawing.
    turtle.penup()
    turtle.forward(50)
```

Grading: 3 pts loop, 6 pts lines with pendown, 6 pts movement with pen up.

4) (3 pts) What type of food is served at the restaurant Little Greek? <u>**Greek**</u> **(3 pts Give to All)**