Fall 2020 COP 2930 Midterm Exam Part B

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

Directions: Please use your course notes and a calculator as aids for this exam. Do NOT attempt to look up information online and do NOT run things in IDLE. Please type your answers directly in the provided .docx file, or type your answers in your own text file or .docx file. The accepted file types for submission will be .doc, .docx, .txt and .pdf.

It's recommended that you stop working at the due time and start uploading at that time. Anything turned in before the late due time will be accepted for full credit. Anything that doesn't make it in by the late due time will earn a 0. A 10 minute buffer is provided after both due times. Please don't take advantage of these buffers as it's an unnecessary risk.

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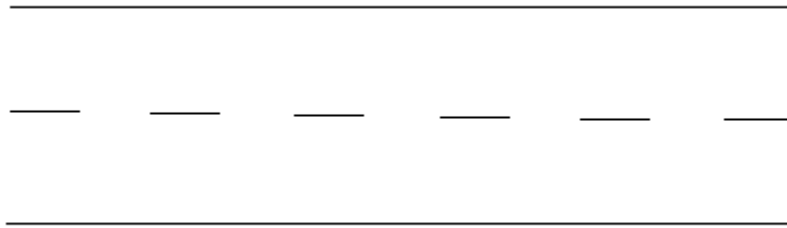
```
Day  Total Candy
1    1
2    4
3    9
```

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

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!*

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

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!*

Here are relevant turtle commands:

```
# Lifts the turtle's pen up.
turtle.penup()

# Puts the turtle's pen down.
turtle.pendown()

# Moves the turtle forward in its current heading d pixels.
turtle.forward(d)

# Moves the turtle to the position x,y without changing heading.
turtle.setpos(x,y)
```

Since this problem requires a lot of code, please add the code to draw the middle line segments only. The code given draws the top and bottom lines and places the turtle in the correct place to start drawing the middle line segments. Add your code after it.

```
# 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.

4) (3 pts) What type of food is served at the restaurant Little Greek?