Honors Introduction to Computer Programming (COP 3223H) Exam #1 - Python

First Name: _____ Last Name: _____

1) (15 pts) Write a complete python program that asks the user to enter in the height, width and length of a rectangular prism (box) and prints out the surface area of the rectangular prism.

2) (15 pts) Steve and Mary's sells college apparel. The first 10 items you buy cost $10 each and any item after the 10^{th} costs $6 each. Thus, if you buy 6 items you would spend $60 and if you buy 12 items you would spend $112. Write a complete python program that asks the user to enter the number of items they bought and prints out the total cost of the purchase.

3) (8 pts) What is the output of the following segment of code in python? (Note: you should have 10 numbers separated by spaces all on one line.

```
start = 3
for i in range(8):
    print(start, end=" ")
    start = 2*start - 2
```

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4) (20 pts) Write a complete program that prints out a star design similar to that of the American flag. Your program should ask the user for the number of stars in the first row and the number of rows. For example, a design with 9 stars on the first row with 5 rows should print out as follows:

```
* * * * * * * * *
 * * * * * * * * *
* * * * * * * * * *
 * * * * * * * * *
* * * * * * * * * *
```

5) (15 pts) Assume that setA is a set that contains the following elements: 1, 2, 4, 7, 9 and 13. Assume that setB is a set that contains the following elements: 2, 3, 6, 8, 9, 12, 14. What are the values in the following sets?

```
setA & setB _____________________________________________

setA | setB _____________________________________________

setA - setB _____________________________________________

setB - setA _____________________________________________

setA ^ setB _____________________________________________
```

6) (14 pts) You are considering creating a website UCFCode which hosts programming contests. Each participant will have an integer rating and a number of contests in which they participate. Their score from an individual contest will be an integer in between 0 and 1000, inclusive. To adjust a participant's rating after a contest, you plan on using the following formula:

$$newscore = int((\frac{oldscore \times n + 3 \times thisscore}{n + 3})$$

where *oldscore* is their previous score and *n* is the number of previous contests and int represents truncation. Currently, the data is stored in two dictionaries, one which maps the user handle (string of lowercase letters) to their score, and the other which maps the user handle to the number of contests they've participated in. Let the names of these two dictionaries be ***scores*** and ***numcontests***, respectively. Assume that that these are currently filled with all valid users and that you want to **update a particular participant's score and number of contests.** Complete the code segment below to do so. You may assume that the handle entered by the user exists in both dictionaries and you may declare new variables as you see fit. Please use ***scores*** and ***numcontests*** appropriately, though.

```
handle = input("What is your handle?\n")
thisscore = int(input("What did you get last contest?\n"))
```

7) (12 pts) Complete the function below that takes in two lists (of integers) and creates a new list by interleaving the items in the input lists. For example, if *list1* contained 3, 2, 3, 8 (in that order) and *list2* contained 4, 9, 9, and 4, then you should create a list with the contents 3, 4, 2, 9, 3, 9, 8 and 4, in that order and return it. **You may assume that both lists are non-empty and contain the same number of values. Also, please take the first item from list1 as shown in the example above.**

```
def interleave(list1, list2):

    res = []

    for _____________________________ :

        ____________________________________

        ____________________________________

    return res
```

8) (1 pt) After which great artist is the Teenage Mutant Ninja Turtle Leonado named? (Hint: this artist painted The Last Supper.)

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