Lesson 5
Python: For Loops & While Loops

Name: _____ Date: _____

Loops [6]

1. Why are for and while loops used in programming? Use evidence from the video to support your response.

2. For Questions 2-3, use the following terms to fill in the blanks. Some terms may be used once, multiple times or never.

for	finish	< (less than)
while	increment	= (equal to)
start	> (greater than)	!= (not equal to)

Code 1:
max_age = 30
_____ age _____ max_age:
    print (age)
    age += 1

Code 2:
_____ age in range (_____, _____, _____):
    print (age)

3. Explain the difference between a for loop and a while loop. Use evidence from the video to support your response.

Name: _____ Date: _____

Investment: Script
Program 1

```python
##Title:        Investments
##Description: Python program that returns the number of years
##             required to reach a target balance.

print("This function returns the amount of years it will take to reach a target balance.\n")

def InvestTarget(target,deposit,rate):
    years = 1
    balance = deposit
    while balance <= target:
        years = years + 1
        balance = deposit + balance*(1 + rate)
        print("Year: %d " %years)
        print("Interest: %.3f" %rate)
        print("Deposit: $%.2f" %deposit)
        print("New Balance: $%.2f \n" %balance)

    return years

e = InvestTarget(100000,11000,0.065)
```

Program 2

```python
##             Python program that returns the account balance
##             after a given number of years.

print("This function returns an account balance when given a number of years to save.\n")

def InvestYears(years, deposit, rate):
    balance = deposit
    for year in range (1 , years):
        balance = deposit + balance*(1 + rate)
        print("Year: %d " %year)
        print("Interest: %.3f" %rate)
        print("Deposit: $%.2f" %deposit)
        print("New Balance: $%.2f \n" %balance)

    return balance

f = InvestYears(30,11000,0.065)
```

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Investment Programs

1. Run Program 1. What was the first set of information resulting as an output value?

2. In Program 1, the variable 'years' is initialized at 1. In the while loop, 'years' is incremented by 1.
   a. How does this affect the output?

   b. What should the variable 'years' have been initialized at? (i.e. how would a programmer ensure that the first resulting set of information is for "year 1" instead of "year 2?") Defend your response.

3. In Program 2, the for loop's range was set to '(1, years)'.
   a. How does this affect the output?

   b. What should the range of the for loop be changed? Defend your response.

4. What purpose do the variables 'e' in Program 1 and 'f' in Program 2 serve?

5. Debug and rewrite the code so that it produces the proper outputs. Provide your corrections by writing your cde below. (Hint: after you make code changes, run the code by testing at least three inputs). Explain WHY you made those changes.

Name: _____ Date: _____

Investigation and Programming

Directions:

Your role as an assistant computer programmer means that you must learn to be proficient in many types of programming and coding. For this assignment, you will have to continue learning Python by applying and extending your prior knowledge to understanding for loops, while loops and the specific differences between them. Because you are in training, you will be working on several modules and continue to build upon your skills. You will work on various skills in Python and submit them to the head computer programmer to make sure your codes are both sufficient and efficient. For this task, you will learn and utilize for loops and while loops in Python by designing your own program.

Prompt:

A nearby Recreational Center hired you to work on a project team to organize rotating activities to be offered during the weekends. They want your project team to devise a list of activities that the Recreational Center should run and to create a Python program that displays this information to the patrons. Your job is to think of three activities that the Recreational Center will rotate through. They provided the following rules for you to follow:

- At least THREE user-defined functions - one function for each activity that you propose.
- Each user defined function must have at least two print statements including materials the patron will need and a friendly wish (ex: have fun! Or safe travels! etc.)
- Outside of a while loop
  - Initialize your variable (i.e. test expression)
  - Print statements that show the patron the list of activities you are proposing, including which key they need to press in order to select it
  - Ask the patron what activity they would like to engage in
- While loop (since patrons can choose to attend any number of your proposed activities)
- Inside of the while loop
  - Conditional statements to call the functions (i.e. one if block would call your first activity, etc.)
- You must ensure that a patron's selection is valid
- You CANNOT use any of the activities listed in the sample output below
  - Notice: the blue is produced by the program code, and the black is typed by the patron

Sample Output:

```
Welcome to the Recreational Center! Here's our weekend line-up:

1. Bike Ride (Enter 1).
2. Triathalon (Enter 2).
3. Hike (Enter 3).
Enter q to quit.

What would you like to do?
1
Here's a bicycle.
Be sure to utilize the trail maps.
Ride safe!

What else would you like to do?
2
You will have to complete a 1 mile swim,
then a 12 mile bike, then a 3.2 mile run.
Best of luck!

What else would you like to do?
3
Here's a trail map and some suggested trip plans.
Please complete our survey concluding your hike.
We would love to hear about the quality of our planned trips!
Have fun!

What else would you like to do?
4
Enter a valid response.
What would you like to do?
q
Thank you, good bye!
```