

while loop

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while loop

With the `while` loop we can iterate a set of statements as long as a condition is `True`.

```
while boolean_expression:  
    Statement
```

Care must be taken to set the condition to `False` somewhere in the loop so the loop will end.

Loops that do not end are called infinite loops.

infinite loops

In order for a while loop to end, the condition must become False. The following loop will not end:

```
x = 0

while x < 5: # (infinitely) True
    print(x, "is less than 5")
```

The variable x never gets incremented so it will always be less than 5.

Adding the x += 1 above fixes the problem.

infinite loops

```
x = 0
```

```
while x < 5:
```

```
    print(x, "is less than 5")
```

```
    x += 1
```

This version of the loop increments `x` during each iteration.

Another way to stop the loop

```
x = 0
```

```
while True:
```

```
    print(x, "is less than 5")
```

```
    x += 1
```

```
    if x == 5:
```

```
        break
```

Lab 10-1 ~ 10-2

- Submission
 - Capture the output of your program.
 - Upload both the captured image files and Python files on Blackboard.
 - Create a separate file for each lab; do NOT combine multiple labs into a single file.

Lab 10-1

Create a rock-paper-scissors game program that allows the player to play multiple rounds using a while loop. The player can keep playing until they choose to exit the game.

```
Start Game
1. Rock
2. Paper
3. Scissors
What do you want to throw? 3(enter)

Computer:Paper vs You:Scissors

You win!!!
Do you want to play again(y/n)? y

1. Rock
2. Paper
3. Scissors
What do you want to throw? 2(enter)

Computer:Rock vs You:Paper

You win!!!
Do you want to play again(y/n)? n
Thank you!!!
```

Lab 10-1

Game Initialization and User Input (10 Points):

Successfully displaying game start prompt and options (Rock, Paper, Scissors) (5 Points)

Correctly capturing the user's choice (1, 2, or 3) (5 Points)

Incorrect or missing game initialization/user input (0 Points)

Random Computer Choice Generation (20 Points):

Correctly implementing random number generation for the computer's choice (1 for Rock, 2 for Paper, 3 for Scissors) (20 Points)

Incorrect or faulty random generation (0 Points)

Game Logic and Result Display (30 Points):

Accurately implementing the game logic to determine the winner for each round (30 Points)

Incorrect or faulty game logic (0 Points)

While Loop for Multiple Rounds (20 Points):

Effectively using a while loop to allow continuous gameplay until the player decides to exit (20 Points)

Ineffective or missing implementation of the while loop (0 Points)

Play Again Prompt and Exit (10 Points):

Correctly prompting the player to play again or exit after each round (10 Points)

Missing or incorrect play again/exit prompt (0 Points)

Outcome Presentation and Game Closure (10 Points):

Clearly displaying the outcome of each round and a polite closing message upon game exit (10 Points)

Incorrect or unclear outcome presentation/game closure (0 Points)

Total Points: 100

Lab 10-2

Write a Python program that takes an integer k as input from the user and displays the first k prime numbers.

User Input:

The program should prompt the user to enter a positive integer k .

Validate the input to ensure it's a positive integer.

Output:

Display the first k prime numbers in a formatted manner.

For example:

Please input k: 5

Prime numbers: 2 3 5 7 11

Please input k: -1

Please input a positive number

Please input k: 3

Prime numbers: 2 3 5

Lab 10-2

User Input for k (20 Points):

Accurately prompting for and capturing the user's input for the integer k (10 Points)

Validating the input to ensure it's a positive integer (10 Points)

Incorrect prompt or failure to validate (0 Points)

Prime Number Generation Logic (40 Points):

Correctly implementing logic to generate the first k prime numbers (40 Points)

Incorrect or faulty prime number generation logic (0 Points)

Handling Invalid Input (20 Points):

Appropriately handling negative or invalid inputs by prompting "Please input a positive number" and re-prompting for k (20 Points)

Failure to handle invalid inputs correctly (0 Points)

Correct Output Display (20 Points):

Displaying the first k prime numbers in a formatted manner, as specified (20 Points)

Incorrect or missing output format (0 Points)

Total Points: 100