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Python for Data Analysis and Visualization

Professor Shams

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**Quiz #1**

**Question 1: Variables and Functions**

Write a Python function called calculate\_circle\_area that takes the radius of a circle as an argument and returns the area of the circle. Use this function to calculate the area of a circle with a radius of 5.

A screenshot of a computer program

Description automatically generated

In this program I have the basic main function and a function calling the main function which then exits smoothly upon main’s completion.

I import sys in order to perform sys.exit()

I import math in order to get the value of pi (math.pi)

Within the function main I have it setting the variable radiusOfCircle equal to 5 as the instructions told us to have it set to 5, however, it would be incredibly easy to set it to whatever the user wants by setting a variable to then be equal to the float input of a user and then passing that through to the calculate circle area.

After setting the radius of the circle I call the function calculate\_circle\_area and I pass through to it the value of radiusOfCircle which is 5.

In the function calculate\_circle\_area I take in a variable, radiusOfCircle, and then I tell it to define area and then set area to calculate pi times by the radiusOfCircle and then times this by the radiusOfCircle again, as the formula for the area of a circle is piR^2, I can use the pow function to square the number, I could also use the built-in operator \*\* and 2, however, multiplying by itself also does the same thing, I then return the variable area and since it is calling it through a print it then prints it out. The result is:

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Description automatically generated

78.539 which is accurate.

**Question 2: Lists and Comprehensions**

Create a list called numbers containing integers from 1 to 10. Use a list comprehension to create a new list called squared\_numbers that contains the squares of the numbers in the numbers list.

A screen shot of a computer program

Description automatically generated

In this program I have as similar to all of my others, defining the main function and calling the name function, smoothly exiting and importing sys to do so.

I created a list called numbers with all of the integers 1 – 10.

I then prepare a list called squared\_numbers with nothing in it

I create a for loop that goes through every integer in the numbers list which then sets a variable called square which takes in the current item/number in the numbers list and then I use the operator \*\* 2 in order to square the number. After this, I append this number onto the squared\_numbers list.

After the for loop has completed the squared\_numbers list is fully populated with the squares for each number, which I then print out and have the output of:

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Description automatically generated

Which are the correct squares of the numbers.

**Question 3: Loops and Conditionals**

Write a Python program that prints all prime numbers between 1 and 50. You'll need to use a loop to iterate through the numbers and implement a check to determine if a number is prime or not.

A screenshot of a computer program

Description automatically generated

In this program I have as similar to all of my others, defining the main function and calling the name function, smoothly exiting and importing sys to do so.

To start off, I create a for loop with the range of 1 – 51, this is because I do not want the number 0 and I want to end at 50. If I had set it to 50 instead of 51 it will end at 49 rather than 50, the same for if I started at 0 it will start at 0 rather than 1.

Next, I do a simple check for if the number is greater than 1, as 1 is not a prime number, however, it would pass the test saying it is prime, and if it is not greater than 1 it will be passed. I could, however, change the range to skip 1 as I know it is not a prime number, however, the question says specifically to check so I instead made the if check. I then start a for loop telling it to continue for as long as it is in the range of 2, number which allows it to properly loop through the numbers.

After this, in the for loop, I do an if statement which states if the number modulo i, or in other words the remainder of the number divided by the current i in this for loop. If the remainder is equal to 0 it is not a prime number and this current increment should break and move to the next number. If it is not equal to 0 and has a remainder it is a prime number and therefore it goes to the else and prints out the number.

The output for this is:

A screen shot of a computer

Description automatically generated

Which is correct and lists all of the prime numbers 1 – 50.

I have neither given nor received unauthorized aid in completing this work, nor have I presented someone else's work as my own.

*Dalton Murray*