Problem :

Write a Python program to calculate the volume of a cone using the formula V = (pi * radius * radius) * height/3, given the radius & height.

Problem understanding :

It is required to develop a python program to calculate the volume of a cone. User has to input the radius & the height of the cone. These values has to be positive and can be decimal values as well. Formula that will be used for this purpose is the given formula and pi value is assumed as 3.14.

Algorithm :

1. Start
2. Initialize variables.
3. Get/Ask for radius of the base of the cone. If radius value is negative display an error message and go to step 7
4. Get/Ask for height of the code. If height value is negative display an error message and go to step 7
5. Calculate the volume using the formula V = (pi * radius * radius) * height/3
6. Display the calculated volume.
7. Display the message “End of the program …” and ask whether to continue or not.
8. If answer is ‘Yes’ repeat step 3 through step 6.
9. Stop.

Python Code (with Repetition)

```
Radius = 0.0
Height = 0.0
Need_to_continue = "Yes"

while(Need_to_continue == "Yes"):
    Valid_Radius_Input = "Yes"
    Valid_Height_Input = "Yes"

    # -------- Get the Radius -----------
    Radius = float(input("Enter radius of the base .... "))
    if (Radius <0):
       print("Radius value cannot be negative...\n")
       Valid_Radius_Input = "No"
    if (Radius == 0.0):
       print("Radius value cannot be zero...\n")
       Valid_Radius_Input = "No"

    # ------- Get the Height only if Radius value is valid ----------
    if (Valid_Radius_Input == "Yes"):
          Height = float(input("Enter height of the cone .... "))
          if (Height <0):
             print("Height value cannot be negative...\n")
             Valid_Height_Input = "No"
          if (Height == 0.0):
             print("Height value cannot be zero...\n")
             Valid_Height_Input = "No“

    # --------- Calculate & display volume only if values are valid values ----------

    if (Valid_Radius_Input == "Yes" and Valid_Height_Input == "Yes"):
       Volume = ((3.14 * Radius * Radius) * Height)/3

       #-------- Display the Volume ----------
       print("\n")
       print("Volume of the cone = ",format(Volume,'.2f'),'\n\n')
    else:
       print("Couldn't calculate the Volume due to invalid inputs. Please try again with valid inputs.\n")
     #--------  Continue if needed ----------
```

If invalid Radius, update the variable Valid_Radius_Input to “No”

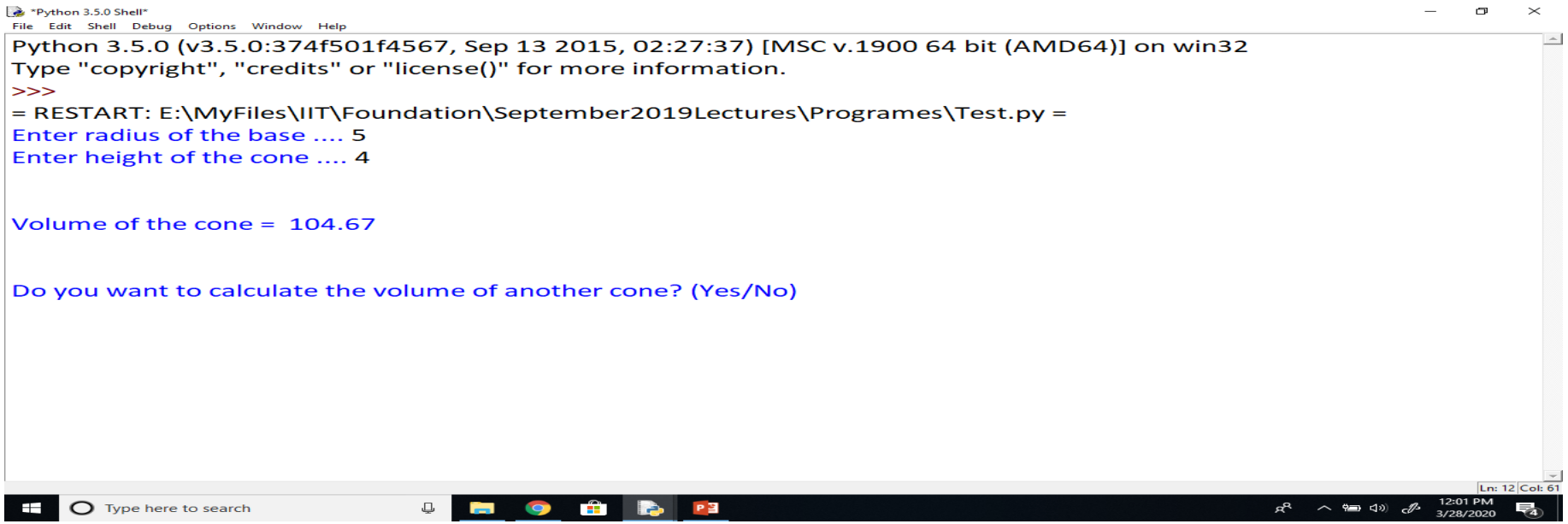
If valid Radius, then ask for Height value

If invalid Height, update the variable Valid_Height_Input to “No”

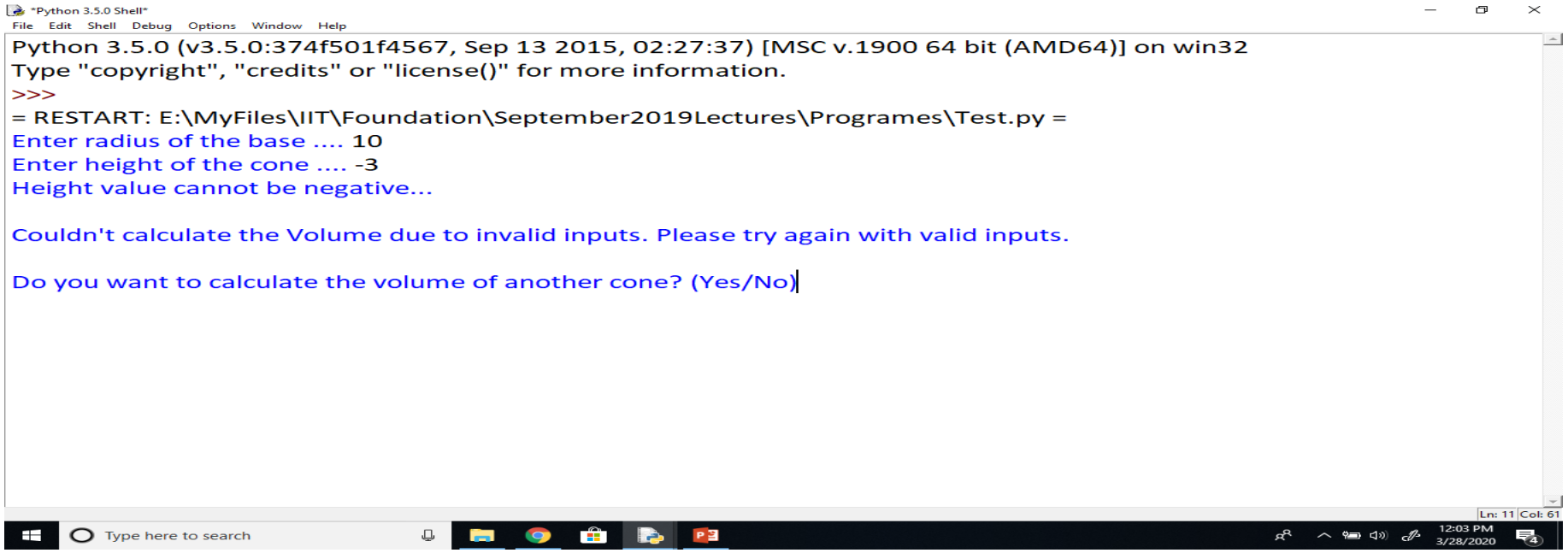
If both Radius & Height values are valid then calculate & display the volume

Test Case #	Inputs		Expected Output	Actual Output	Remarks
	Radius	Height			
1	5	4	Volume of the cone = 104.67 Do you want to calculate the volume of another cone? (Yes/No)	Volume of the cone = 104.67 Do you want to calculate the volume of another cone? (Yes/No)	Test case pass.
2	10	-3	Couldn't calculate the Volume due to invalid inputs. Please try again with valid inputs.	Couldn't calculate the Volume due to invalid inputs. Please try again with valid inputs.	Test case pass
3	5.3	6.7	Volume of the cone = 196.99 Do you want to calculate the volume of another cone? (Yes/No)	Volume of the cone = 196.99 Do you want to calculate the volume of another cone? (Yes/No)	Test case pass
4	-3.4	5.0	Radius value cannot be negative... Couldn't calculate the Volume due to invalid inputs. Please try again with valid inputs.	Radius value cannot be negative... Couldn't calculate the Volume due to invalid inputs. Please try again with valid inputs.	Test case pass
5	7.2	-2.5	Height value cannot be negative... Couldn't calculate the Volume due to invalid inputs. Please try again with valid inputs.	Height value cannot be negative... Couldn't calculate the Volume due to invalid inputs. Please try again with valid inputs.	Test case pass
6					

Test Case 1



Test Case 2



Python Code (without Repetition)

```
Radius = 0.0
Height = 0.0


Valid_Radius_Input = "Yes"
Valid_Height_Input = "Yes"

# -------- Get the Radius -----------
Radius = float(input("Enter radius of the base .... "))
if (Radius <0):
   print("Radius value cannot be negative...\n")
   Valid_Radius_Input = "No"
if (Radius == 0.0):
   print("Radius value cannot be zero...\n")
   Valid_Radius_Input = "No"

# ------- Get the Height only if Radius value is valid --------------
if (Valid_Radius_Input == "Yes"):
      Height = float(input("Enter height of the cone .... "))
      if (Height <0):
         print("Height value cannot be negative...\n")
         Valid_Height_Input = "No"
      if (Height == 0.0):
         print("Height value cannot be zero...\n")
         Valid_Height_Input = "No“

# --------- Calculate & display volume only if values are valid values ------------
if (Valid_Radius_Input == "Yes" and Valid_Height_Input == "Yes"):
   Volume = ((3.14 * Radius * Radius) * Height)/3

   #-------- Display the Volume ----------------
   print("\n")
   print("Volume of the cone = ",format(Volume,'.2f'),'\n\n')
else:
   print("Couldn't calculate the Volume due to invalid inputs. Please try again with valid inputs.\n")
```