

**Question 1:**

**Explain the difference between a function prototype and a function definition.**

FUNCTION DEFINITION	FUNCTION PROTOTYPE
Function is a block of code which is used to accomplish a particular task and we can use it whenever and wherever we need in order to avoid repeated lines of code.	Function prototype is the declaration of the function that specifies the function's name, the data type of its arguments and its return type.
It is used to differentiate the functionalities the program has, so later all these can be combined to perform a complex task.	It tells the compiler about the user defined function's information (like number of arguments, their data types, return type etc..). So if the prototype is omitted, the compiler will end up doing some operations on some other data which results in compile error.
<pre>#include &lt;stdio.h&gt;  float calculateArea(int x, int y);  int main () {     int num1 =10;     int num2= 20;     float area;     area = calculateArea(num1,num2);     printf("The area is %f\n", area);     return 0; }  float calculateArea (int x, int y) {     float value;     value = 0.5 * x * y;     return value; }</pre>	<pre>#include &lt;stdio.h&gt;  float calculateArea(int x, int y);  int main () {     int num1 =10;     int num2= 20;     float area;     area = calculateArea(num1,num2);     printf("The area is %f\n", area);     return 0; }  float calculateArea (int x, int y) {     float value;     value = 0.5 * x * y;     return value; }</pre>

FUNCTION DEFINITION

FUNCTION PROTOTYPE

**Question 2:**

**Find the algorithm and flow chart to calculate the Volume of cube (volume = length \* length \* length).**

**Algorithm**

Step 1: Start

Step 2: Accept the length of the cube as an input.

Step 3: If length is lesser than 0, then display "Invalid input".

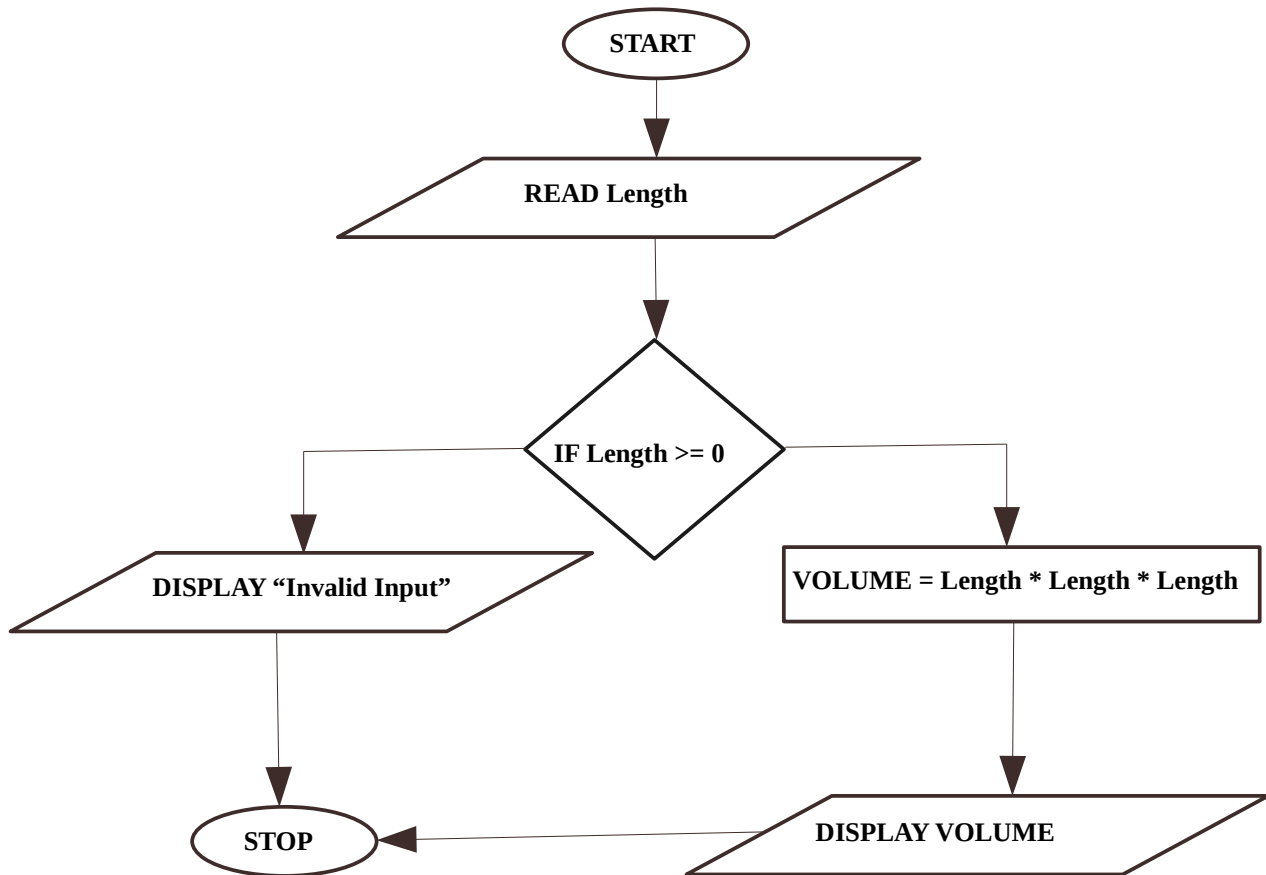
Step 4: If length is greater than or equal to 0, then GOTO step 5.

Step 5: Volume = length \* length \* length

Step 6: Display Volume

Step 7: Stop

**Flow chart**



**Question 3:**

The number of lines that can be printed on a paper depends on the paper size, the point size of each character in a line, whether lines are double-spaced or single-spaced, the top and bottom margin, and the left and right margins of the paper. Assume that all characters are of the same point size, and all lines are either single-spaced or double-spaced. Note that 1 inch = 72 points.

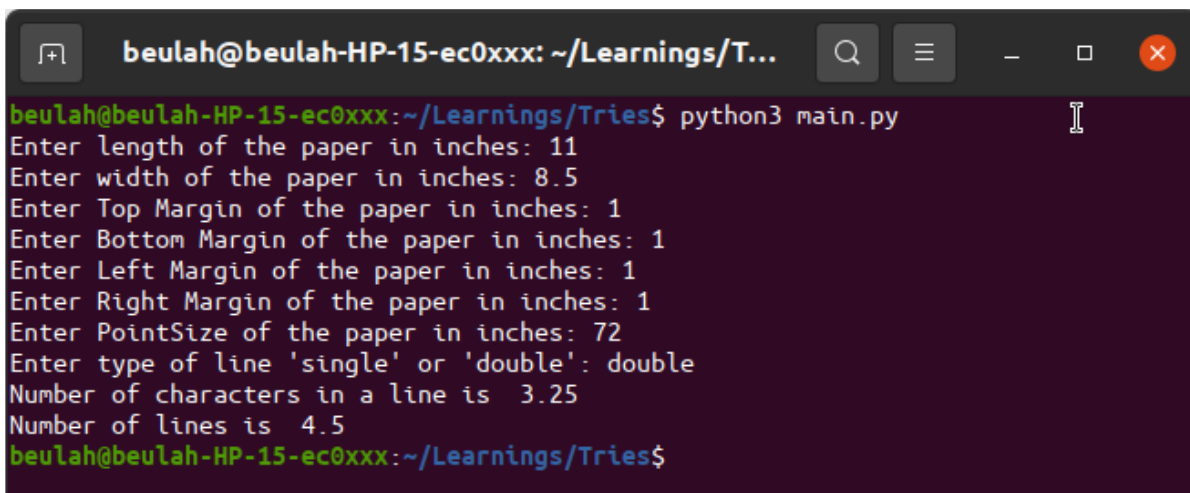
Moreover, assume that the lines are printed along the width of the paper. For example, if the length of the paper is 11 inches and width is 8.5 inches, then the maximum length of a line is 8.5 inches. Write a program that calculates the number of characters in a line and the number of lines that can be printed on a paper based on the following input from the user:

- The length and width, in inches, of the paper
- The top, bottom, left, and right margins
- The point size of a line
- If the lines are double-spaced, then double the point size of each character

```
length = float(input("Enter length of the paper in inches: "))
width = float(input("Enter width of the paper in inches: "))
top = float(input("Enter Top Margin of the paper in inches: "))
bottom = float(input("Enter Bottom Margin of the paper in inches: "))
left = float(input("Enter Left Margin of the paper in inches: "))
right = float(input("Enter Right Margin of the paper in inches: "))
pointSize = float(input("Enter PointSize of the paper in inches: "))
line = input("Enter type of line 'single' or 'double': ")
if(line == 'double'):
    pointSize *= 2

length = length - (top + bottom)
width = width - (right + left)
charNum = (width * (72)) / (pointSize)
pointSize = pointSize / 72
lineNum = length / pointSize

print("Number of characters in a line is ", charNum)
print("Number of lines is ", lineNum)
```

A terminal window with a dark background and light-colored text. The window title is "beulah@beulah-HP-15-ec0xxx: ~/Learnings/T...". The prompt is "beulah@beulah-HP-15-ec0xxx:~/Learnings/Tries\$". The user has entered "python3 main.py". The program prompts for several inputs: "Enter length of the paper in inches: 11", "Enter width of the paper in inches: 8.5", "Enter Top Margin of the paper in inches: 1", "Enter Bottom Margin of the paper in inches: 1", "Enter Left Margin of the paper in inches: 1", "Enter Right Margin of the paper in inches: 1", and "Enter PointSize of the paper in inches: 72". The user enters "double" for the line type. The program then outputs "Number of characters in a line is 3.25" and "Number of lines is 4.5". The prompt returns to "beulah@beulah-HP-15-ec0xxx:~/Learnings/Tries\$".

```
beulah@beulah-HP-15-ec0xxx:~/Learnings/Tries$ python3 main.py
Enter length of the paper in inches: 11
Enter width of the paper in inches: 8.5
Enter Top Margin of the paper in inches: 1
Enter Bottom Margin of the paper in inches: 1
Enter Left Margin of the paper in inches: 1
Enter Right Margin of the paper in inches: 1
Enter PointSize of the paper in inches: 72
Enter type of line 'single' or 'double': double
Number of characters in a line is 3.25
Number of lines is 4.5
beulah@beulah-HP-15-ec0xxx:~/Learnings/Tries$
```

#### Question 4:

##### In electronic mail, what is MIME?

MIME (stands for Multi-Purpose Internet Mail Extensions) is an extension of the Internet electronic-mail protocol which is widely used to exchange data files (like audio files, video files, images, application program etc.,) over the Internet. MIME provides a mechanism to exchange non-text characters to text characters which mainly provides the capability to send non-ASCII files via e-mail messaging. To contain a non-ASCII file such as a video image or a sound and it provides a mechanism to transfer a non-text character to text characters. In 1991, Nathan Borenstein of Bellcore proposed this to IETF (i.e. extension of SMTP) so that new file types were added to mail as a supported Internet Protocol file type.

#### Question 5:

Draw the binary tree representing the following arithmetic expression:

$G / H * (A + B) \$ C \$ (D - F)$

Where, \$ has the highest precedence and right to left associativity.

