

Lab 5: Series Sums, Simplecpp graphics, Conditionals

Week of August 24th

1. Write a program that computes the value of an n th degree polynomial

$$A(x) = a_0 + a_1 x + a_2 x^2 + \dots + a_n x^n$$

Input: Integer n , any float c , float coefficients $a_0, a_1, a_2, \dots, a_n$

Output: Value of $A(x)$ above, evaluated at $x=c$

Hint: You have to use the sequence generation and accumulation idiom. Think about how you will generate the term $a_{i+1} x^{i+1}$ from the previous term $a_i x^i$.

Sample input:

3

2.1

1.3

4

0.9

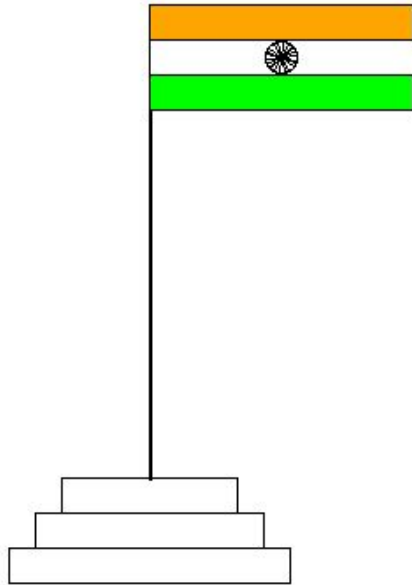
0.5

Sample Output

//Mihir, Nirav - please add

// Nirav please generate testcases and add to TA training lab course on Evalpro

2. Using simplecpp graphics (only as much as has been taught in class) make the Indian flag on a pole and pedestal with solid colours.



3. Write a program to take the length of a sequence of open and closed parenthesis, and the sequence of parentheses [the '(' and ')' brackets] itself, and output "Correct" if it is correctly parenthesized and "Incorrect" otherwise. A sequence is correctly parenthesized if the number of opening brackets ['('] is always more than the number of closing brackets [')'] and at the end of the sequence, they should be equal in number.

eg. Input :

6

((()))()

Output : Correct

Input :

6

()))((

Output : Incorrect

Input :

3

(((),

Output : Incorrect

Extra questions

1. Check whether a number is a palindrome . Take the length of the number and the number as input. Print the reverse of the number and also whether it is a palindrome.

Sample input 1:

4

5413

Sample Output 1

3145

Not a palindrome

Sample input 2

5

23432

Sample output 2

23432

Palindrome

2. Modify the horizontal ball animation program (on the course website) so that the ball bounces when its edge touches the wall. Currently it goes through the wall a little and then bounces.
3. Using ideas from the horizontal ball animation, write a program for simulating the movement of a striker on a (frictionless) carrom board. Specifically:
 - User should click somewhere - this will be the center of the carrom board.
 - Draw a board (a square) of some size there.
 - User clicks somewhere inside the board - this makes a small red circle appear there. This is your striker. Let this be point p1.
 - Now user clicks anywhere else inside the board. Let this be point p2. On this click, striker starts moving from p1, in the direction of p2. It keeps going (even beyond p2), until it hits the side of the board.
 - At this point it should bounce roughly like a perfect reflection. (angle of incidence = angle of reflection). You can interpret exact details yourself.
 - Do this in a repeat loop for some time so that the animation is fun to watch.

Hint - Make sure you use the fact that if you are doing “perfect” reflections, only the sign of the slope of the line changes, the “slope” remains the same. Make your code as clever and elegant as possible.

