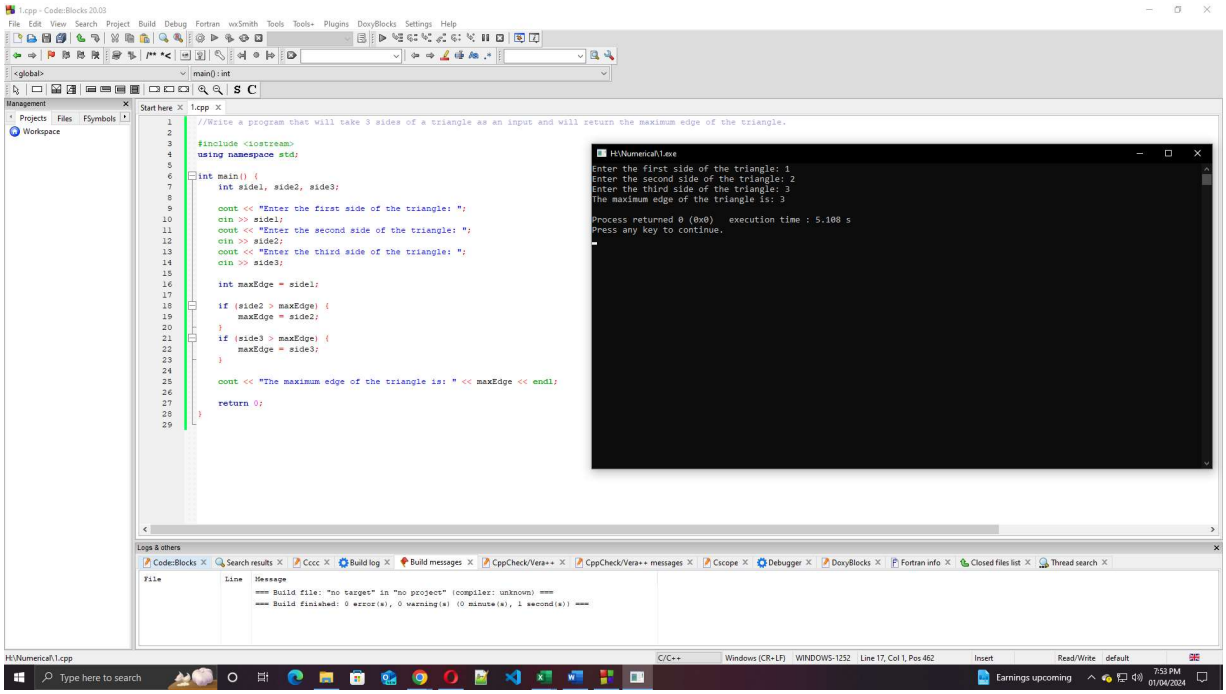
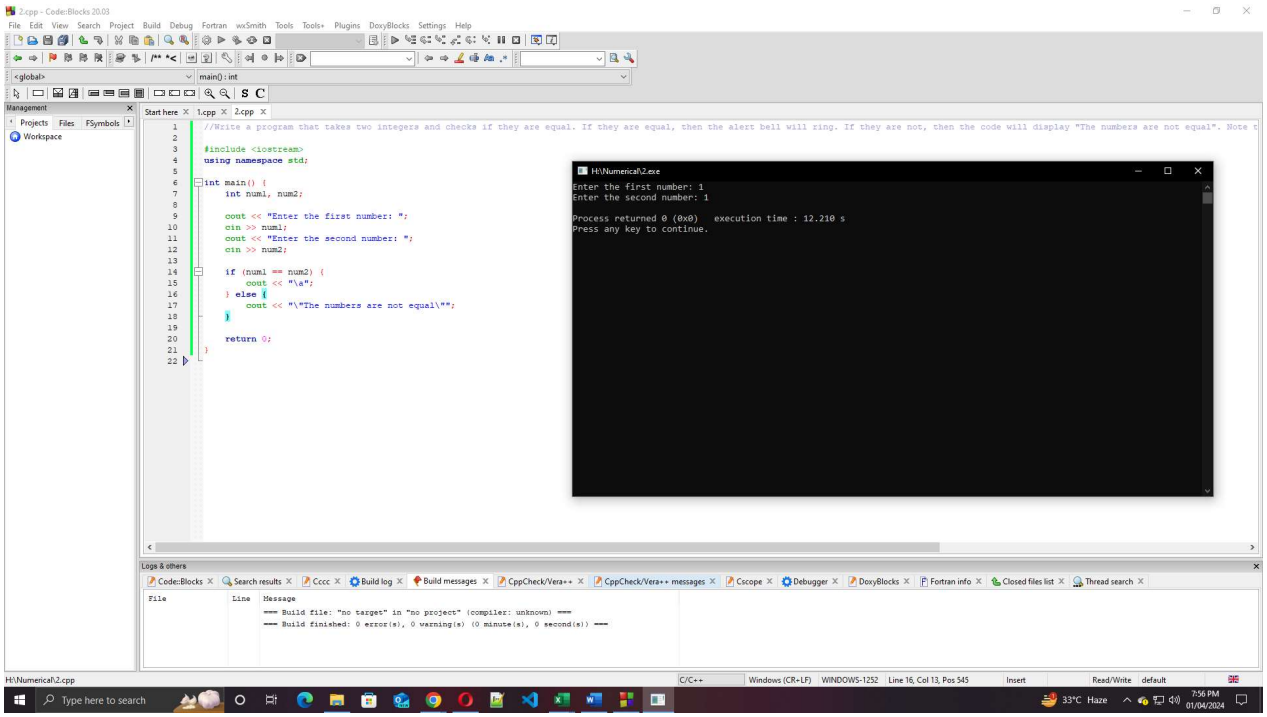
Course Title: Numerical Analysis and Computer Programming

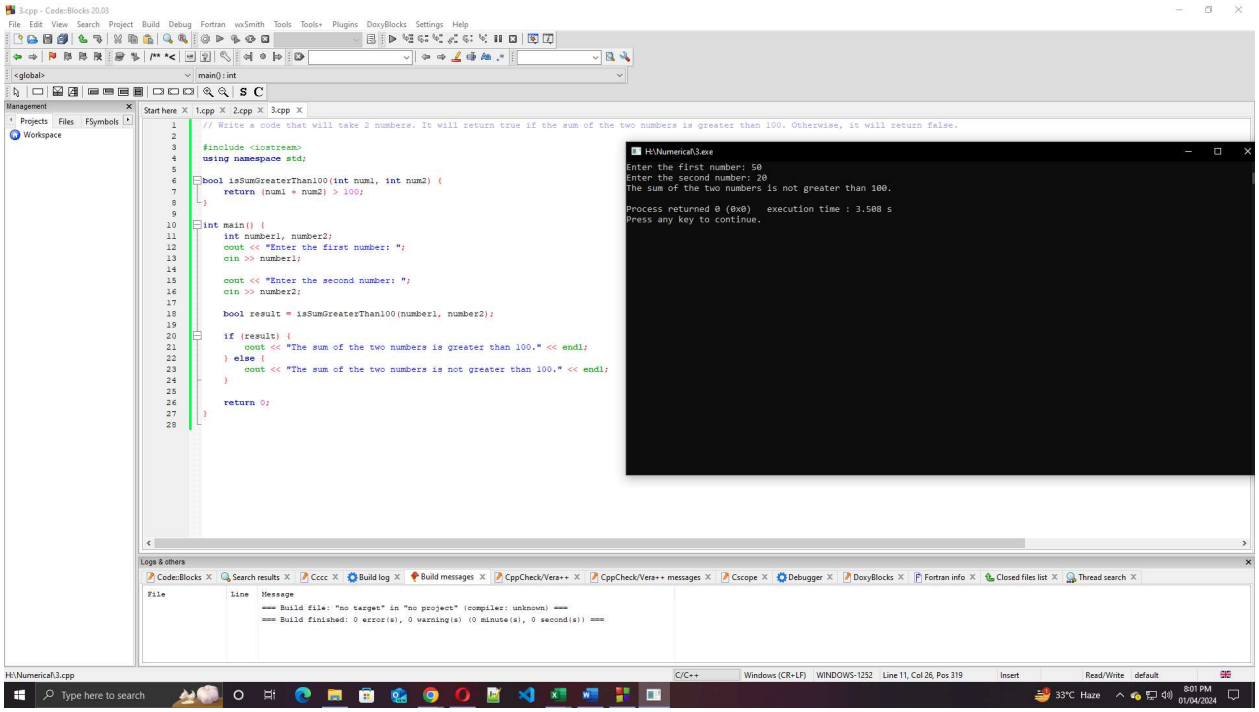
1. Write a program that will take 3 sides of a triangle as an input and will return the maximum edge of the triangle.



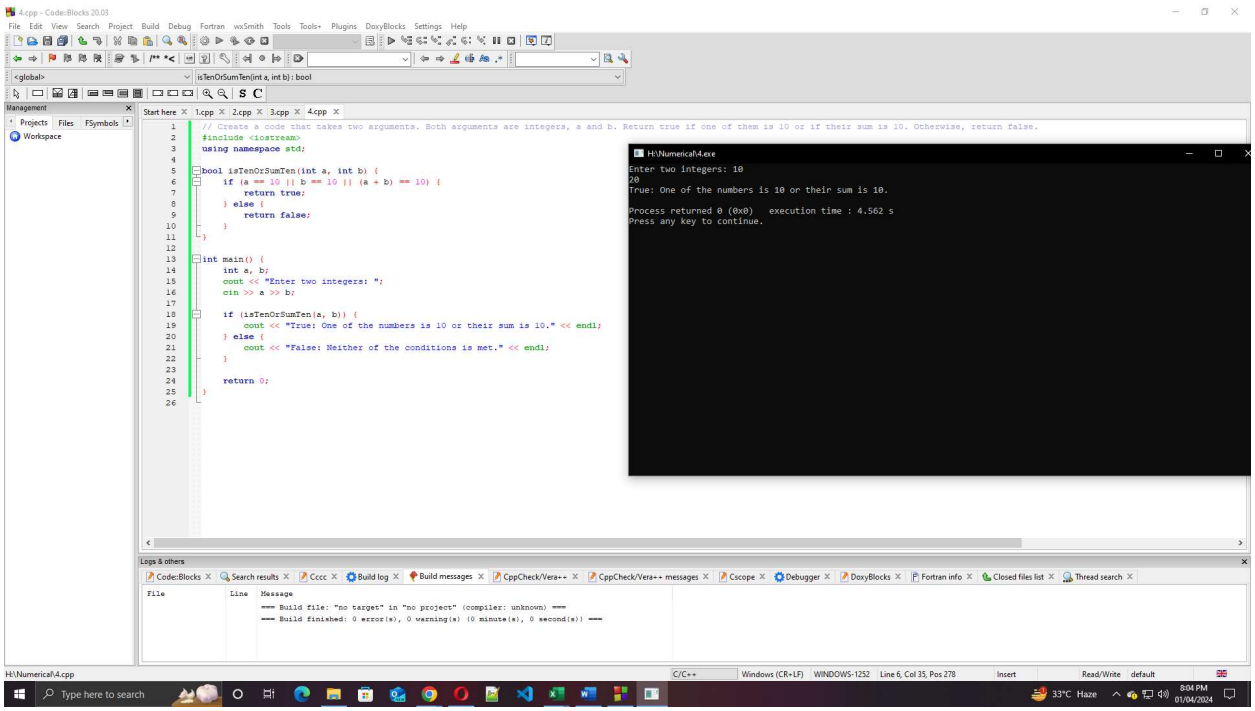
2. Write a program that takes two integers and checks if they are equal. If they are equal, then the alert bell will ring. If they are not, then the code will display "The numbers are not equal". Note that, 'The numbers are not equal" will be shown including the quotation marks.



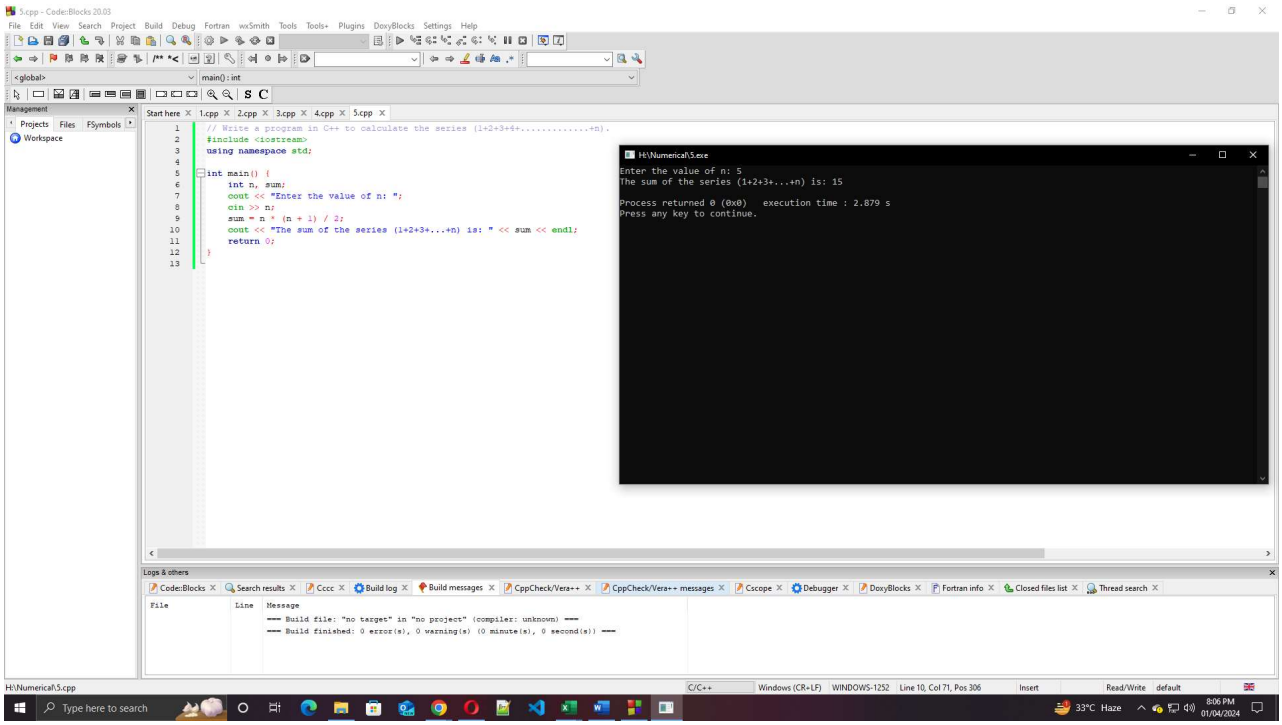
3. Write a code that will take 2 numbers. It will return true if the sum of the two numbers is greater than 100. Otherwise, it will return false.



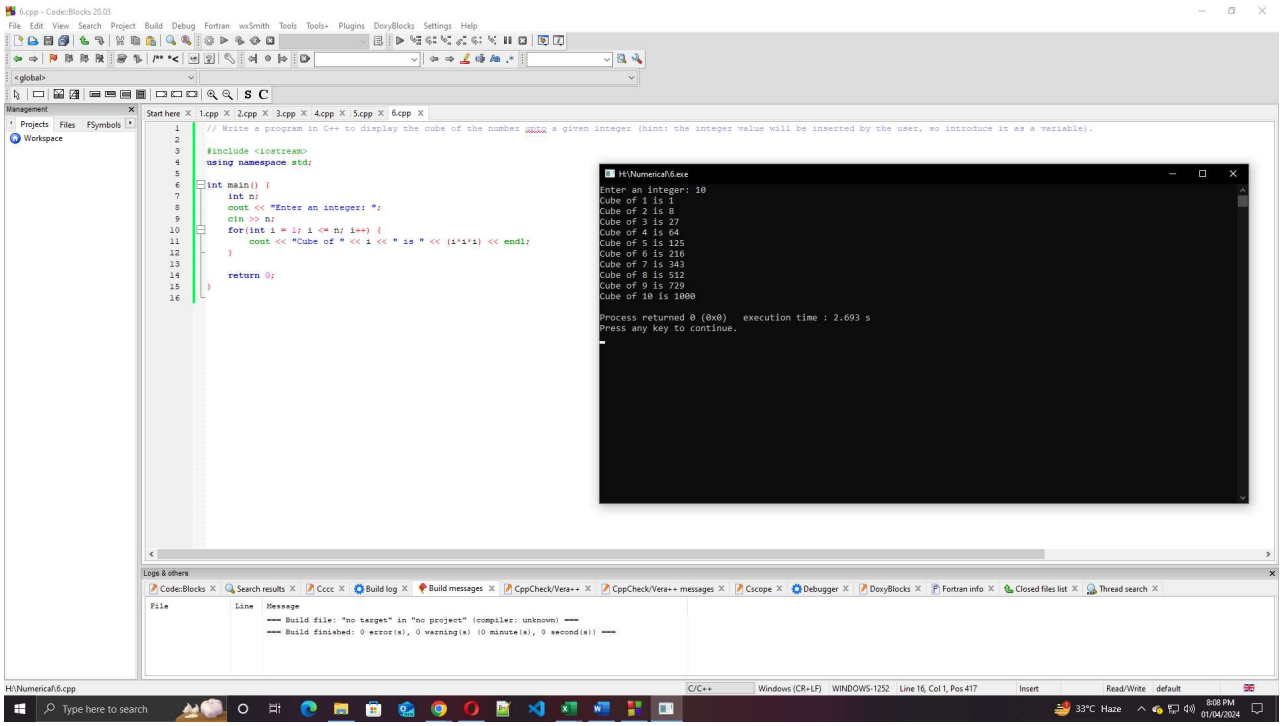
4. Create a code that takes two arguments. Both arguments are integers, a and b. Return true if one of them is 10 or if their sum is 10. Otherwise, return false.



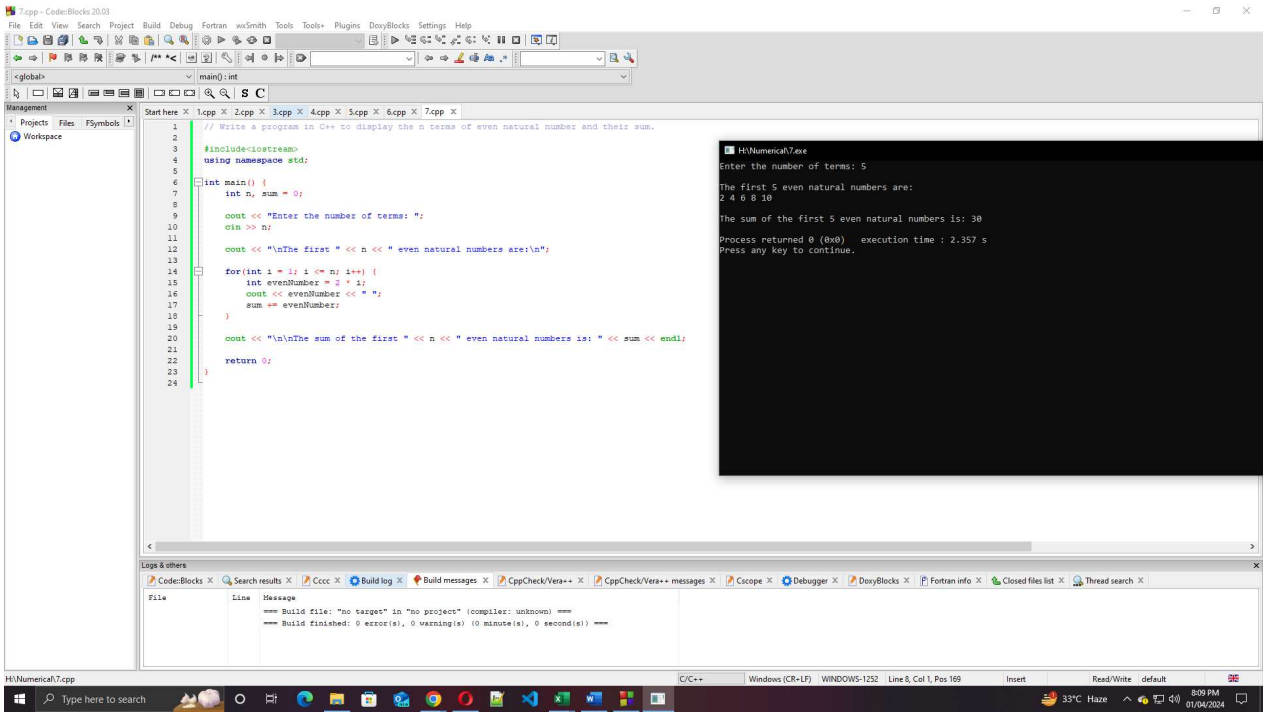
5. Write a program in C++ to calculate the series (1+2+3+4+.....+n).



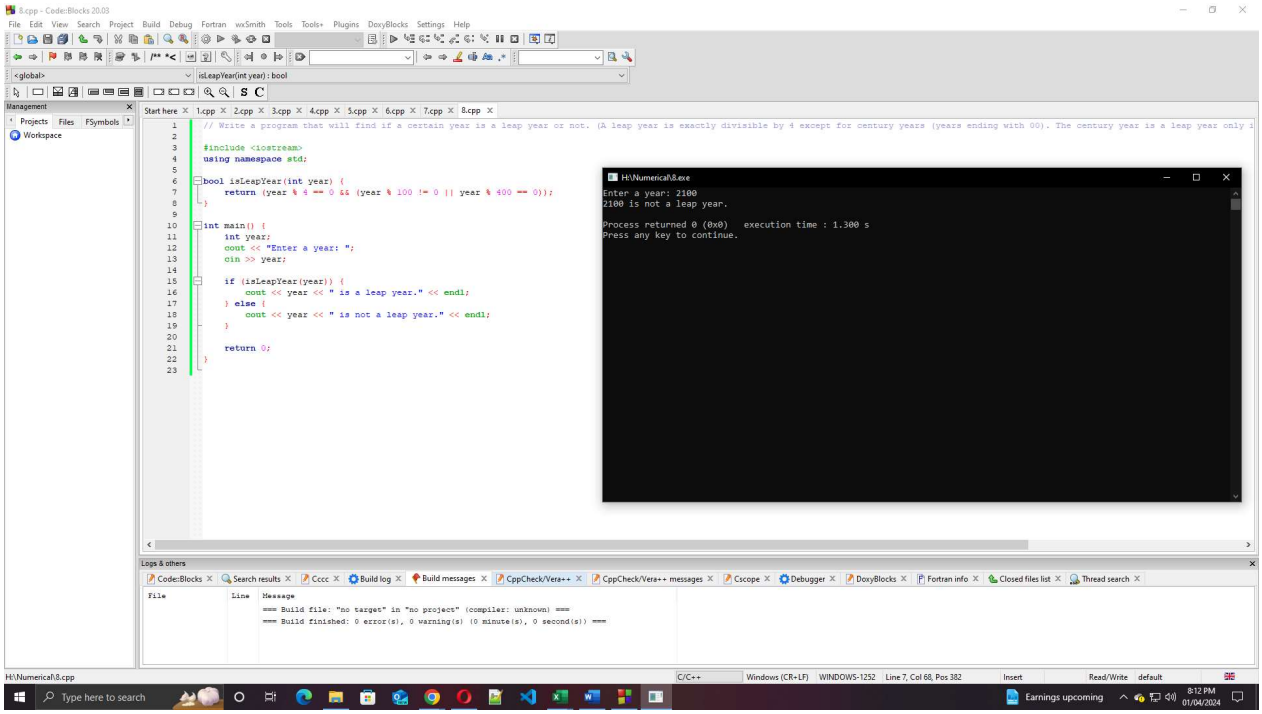
6. Write a program in C++ to display the cube of the number upto a given integer (hint: the integer value will be inserted by the user, so introduce it as a variable).



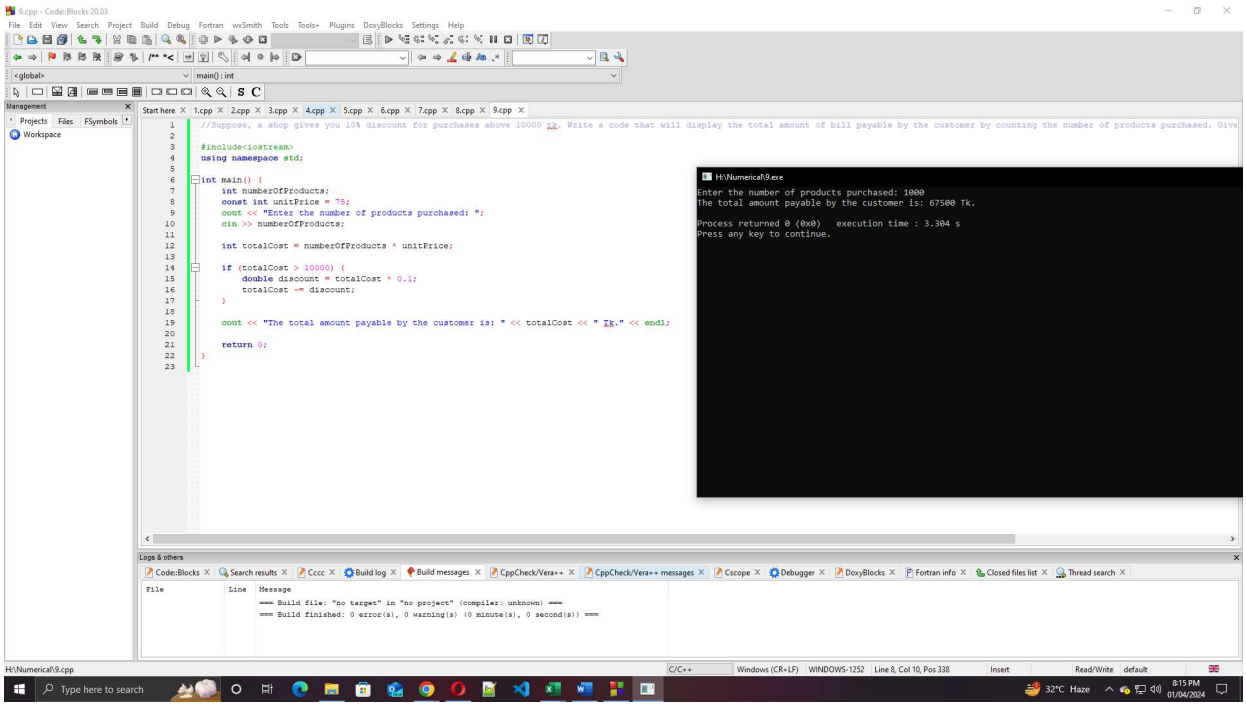
7. Write a program in C++ to display the n terms of even natural number and their sum.



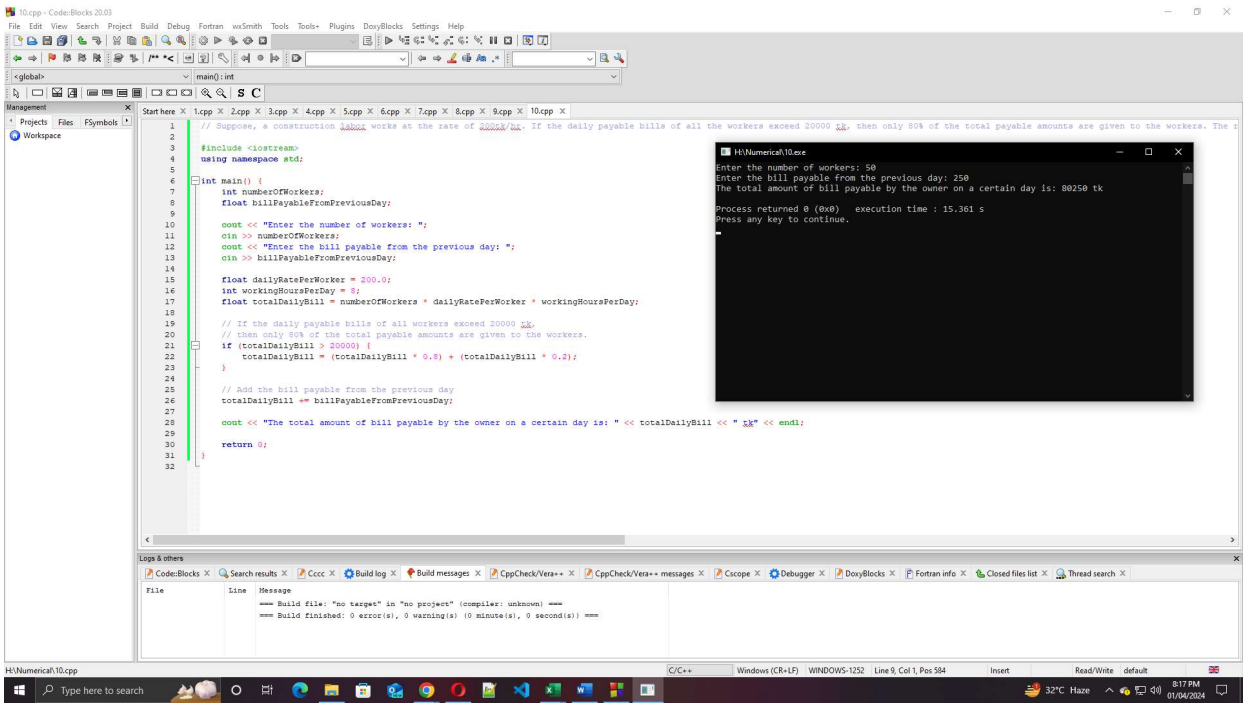
8. Write a program that will find if a certain year is a leap year or not. (A leap year is exactly divisible by 4 except for century years (years ending with 00). The century year is a leap year only if it is perfectly divisible by 400).



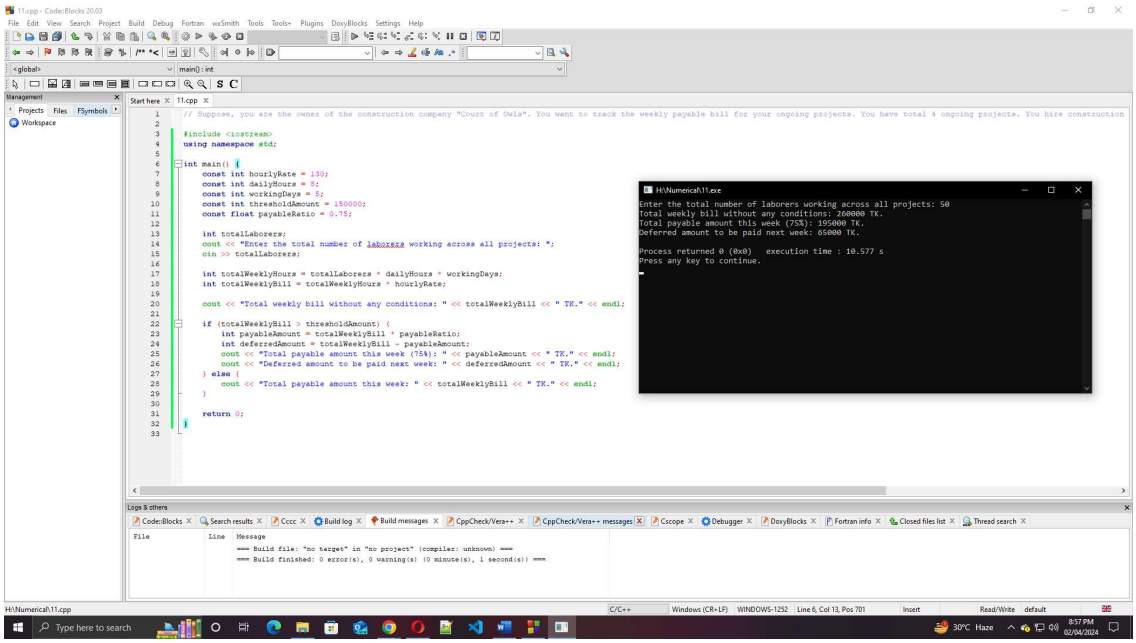
9. Suppose, a shop gives you 10% discount for purchases above 10000 tk. Write a code that will display the total amount of bill payable by the customer by counting the number of products purchased. Given, unit price of the products is 75 tk.



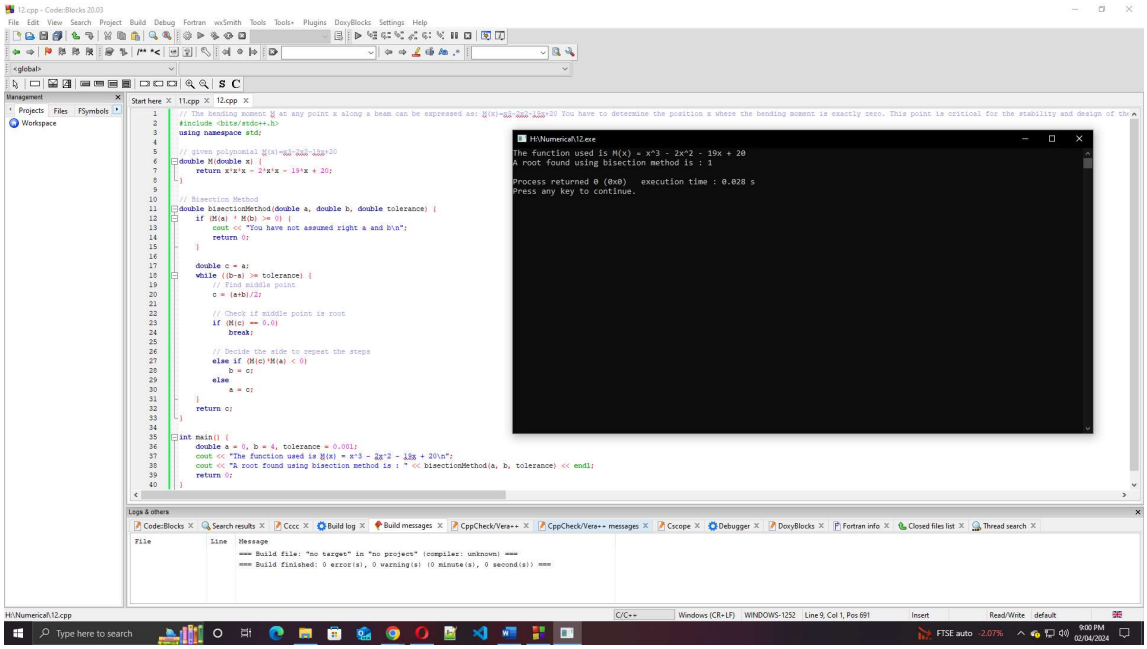
10. Suppose, a construction labor works at the rate of 200tk/hr. If the daily payable bills of all the workers exceed 20000 tk, then only 80% of the total payable amounts are given to the workers. The rest will be paid the next day. Now, write a code that will show the total amount of bill payable by the owner on a certain day. Assume each labor works for 8hr/day (Hint: Take the number of workers and the bill payable from the previous day as variables).



11. Suppose, you are the owner of the construction company "Court of Owls". You want to track the weekly payable bill for your ongoing projects. You have total 4 ongoing projects. You hire construction laborers on weekly basis and distribute them to 4 projects. Each labor works at the rate of 130tk/hr. If the weekly payable bills of all the workers exceed 1,50,000 tk, then only 75% of the total payable amounts are given to the workers. The rest will be paid the next week. Now, create a code using C++ language that will show the total amount of bill payable by you on a certain week. Assume each labor works for 8hr/day and 5 days/week.



12. The bending moment M at any point x along a beam can be expressed as: M(x)=x3-2x2-19x+20 You have to determine the position x where the bending moment is exactly zero. This point is critical for the stability and design of the structure. Create a C++ program to solve the equation M(x)=0 using either the Bisection method or the Regula Falsi method. Consider the beam length to be in the range [0, 4] meters, and precision up to 0.001 meters is acceptable. Your program should output the position x where the bending moment is zero.



13. Suppose, you are the owner of a construction company. You want to create a code for the laborer hiring purpose of a recent multistoried apartment construction project. Given, the carrying rate of different components is as follows: Stone chips: 1 laborer/10000kg; Sand: 1 laborer/20000kg; Cement: 1 laborer/200bag; Now, create a code using C++ that will show the number of laborers needed on a particular day for the variable amount of stone chips, sand and cement carrying purpose. Also show the amount of bill payable each day for the hired laborers (laborer hiring cost is 800tk/day/laborer).