



Object Orientated Programming

Lab Manual 1



Instructor:

Mr. Samyan Qayyum Wahla

Learning Objectives:

- Student should be able to understand and define functions
- Learn to write well documented and formatted code.

CLO:

- CLO1

Registration Number:

Name:

Guidelines/Instructions:

- Use of Djava is must in this lab.
- Write well commented code.
- Name of variables should be meaningful.
- Code should be well formatted.
- Create meaningful variable names. Add comments for readability. Indent each line of your code.
- Plagiarism/Cheating is highly discouraged by penalizing to both who tried and one who shared his/her code.

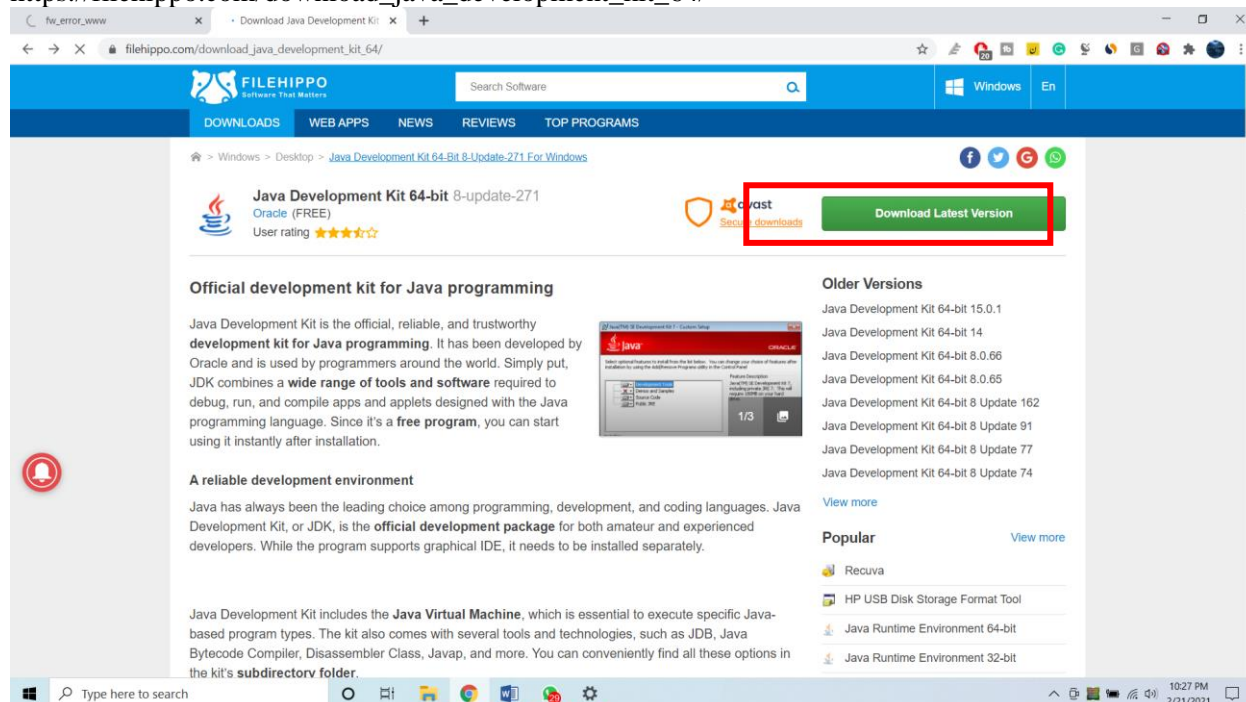
Today's Task

- Download JDK
- Download DJava (Doctor Java)
- Write Hello World Program in Java
- C++ to Java

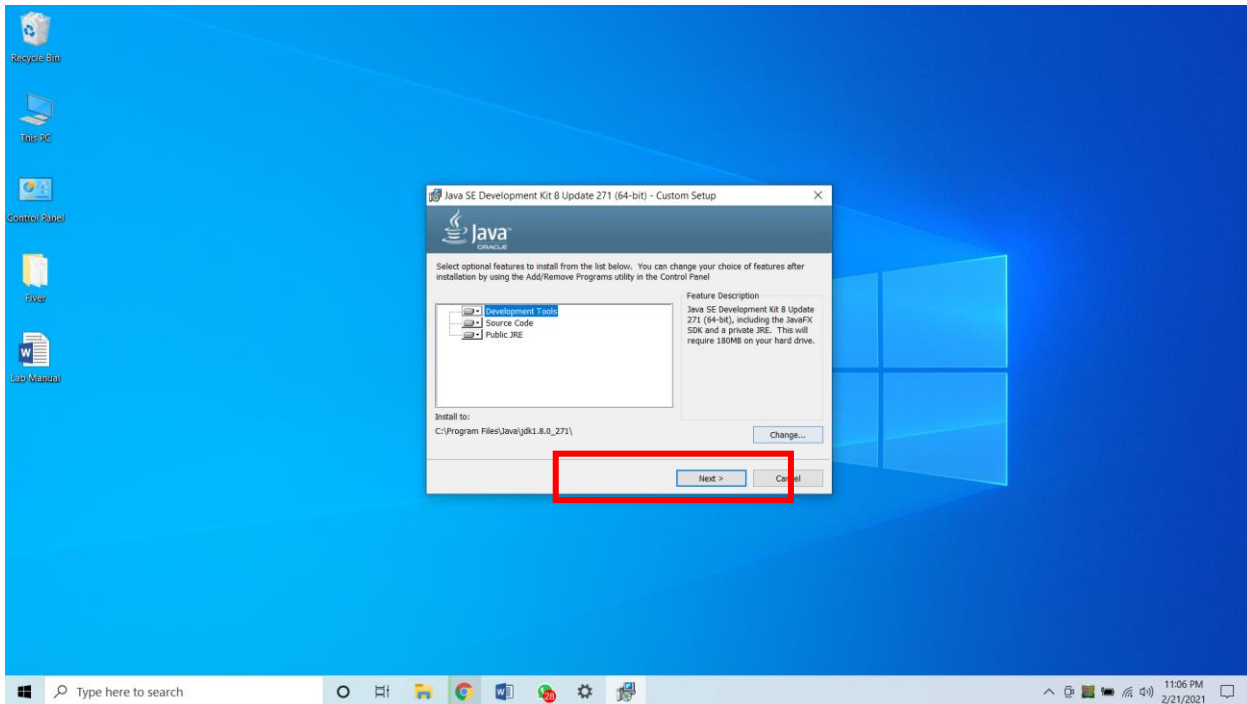
Installation Guide

Download Java Development Kit (JDK)

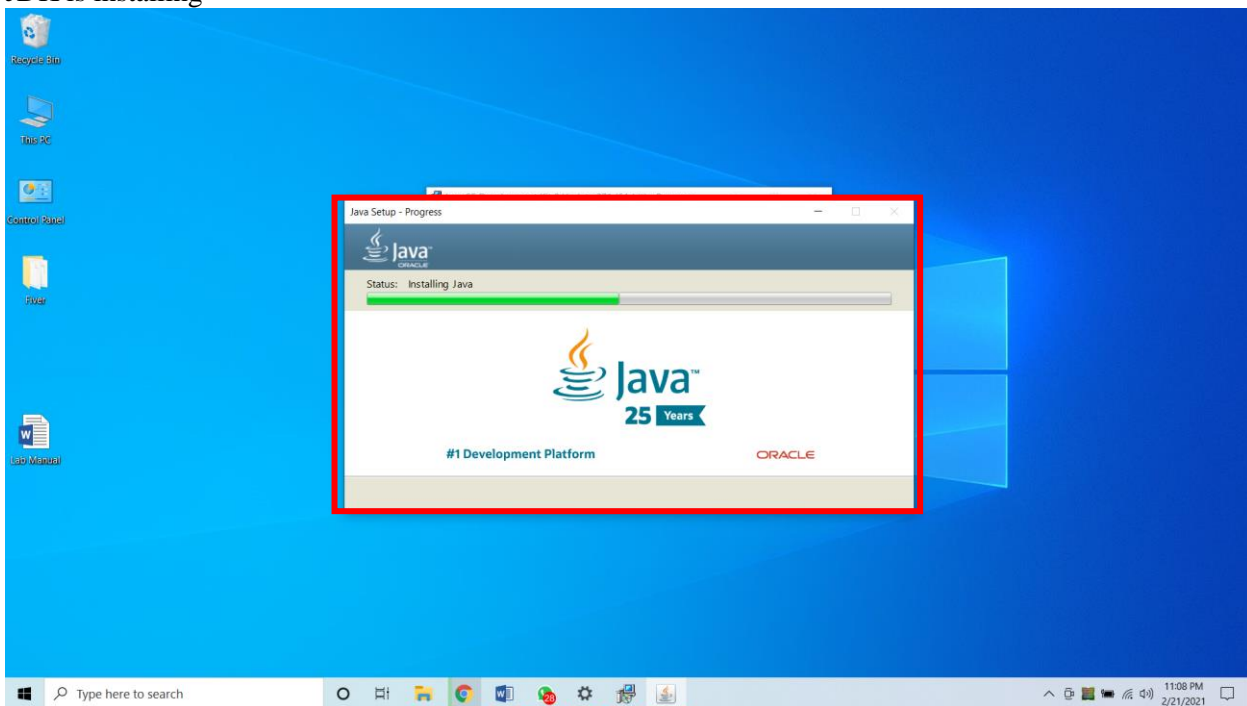
https://filehippo.com/download_java_development_kit_64/



Double click on downloaded JDK file
Choose directory where you want to install this and hit Next button.
Click on Next Button

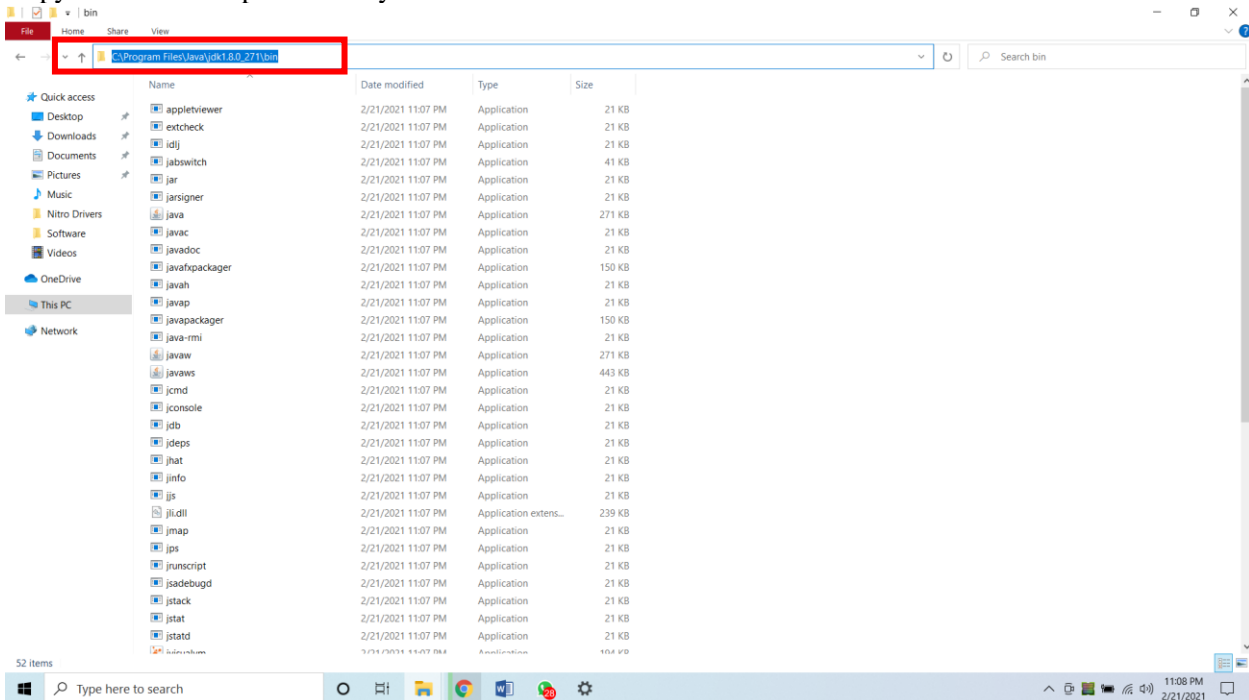


JDK is installing

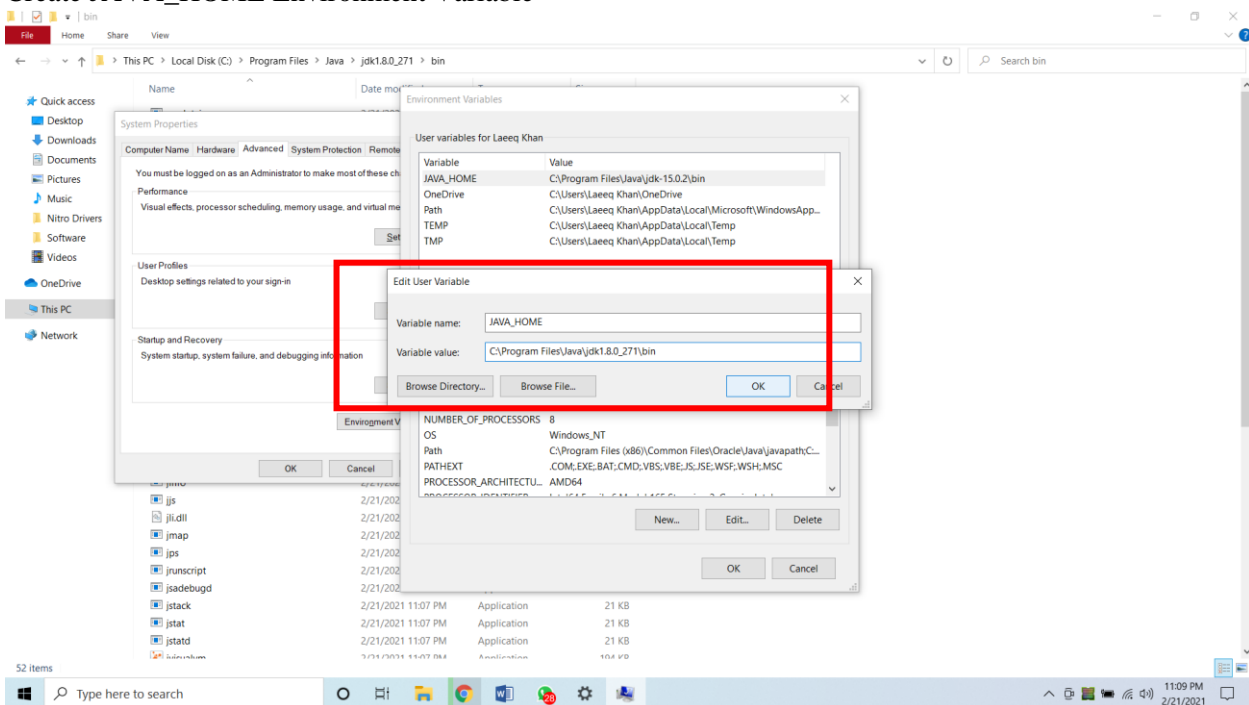


Environment Variable Setup

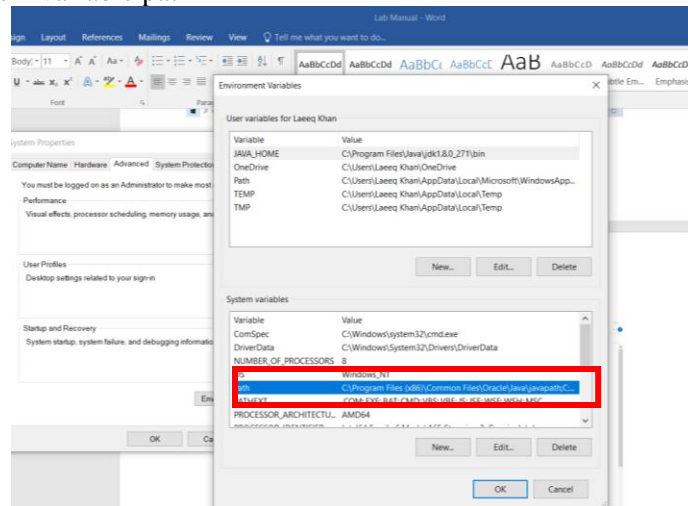
Copy the bin folder path where you have installed JDK



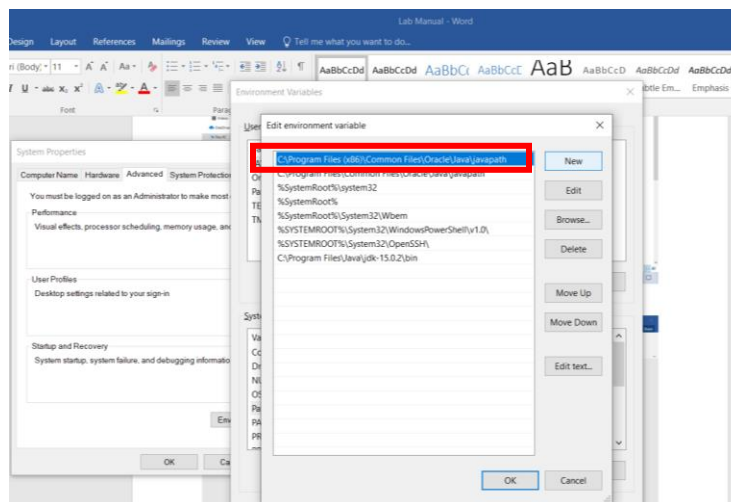
Create JAVA_HOME Environment Variable



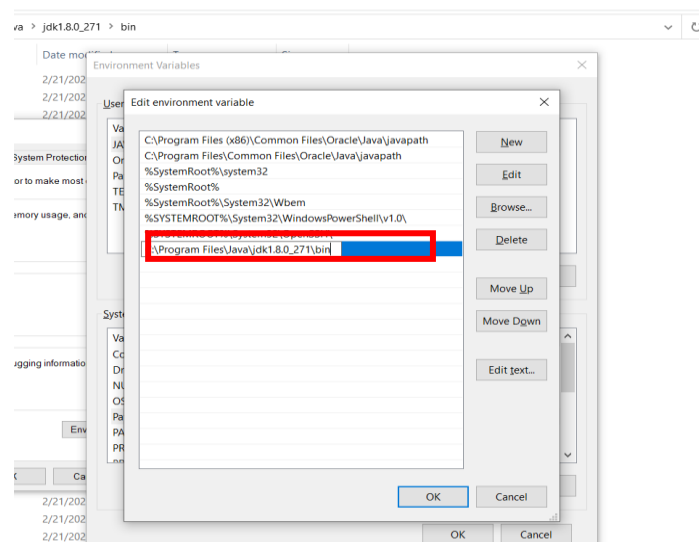
Also add the same path in system variable path



Click on New

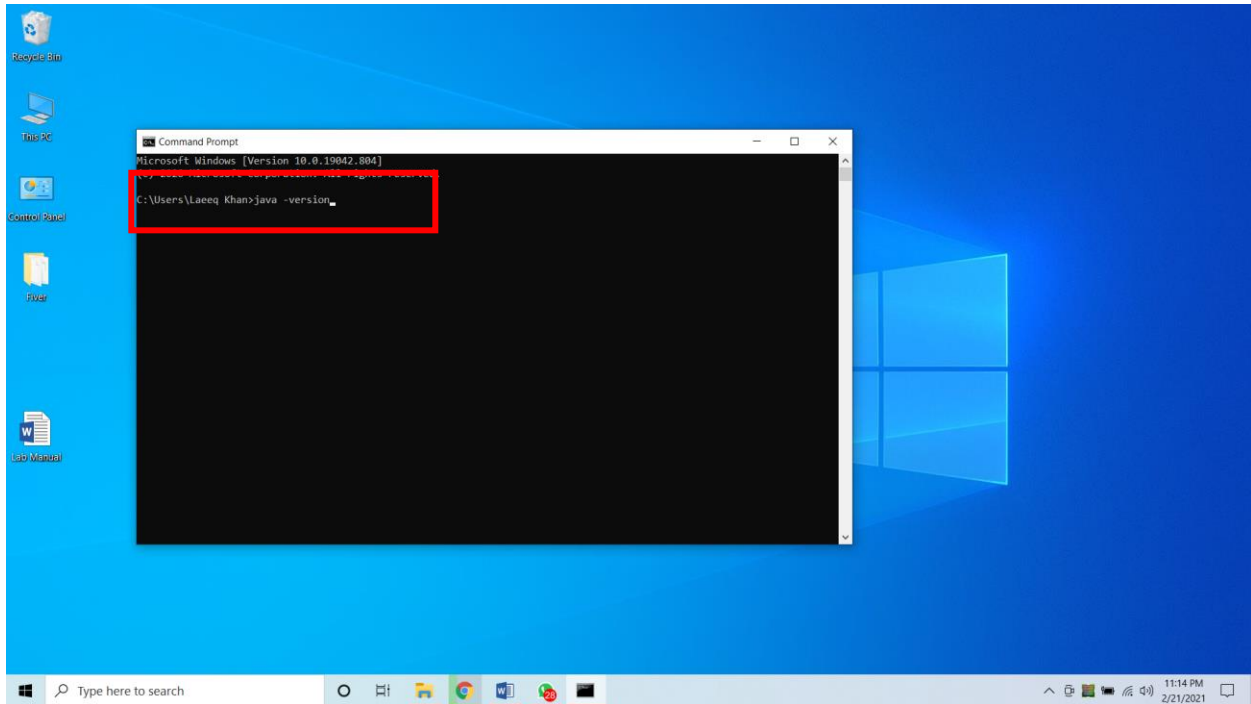


Past your path

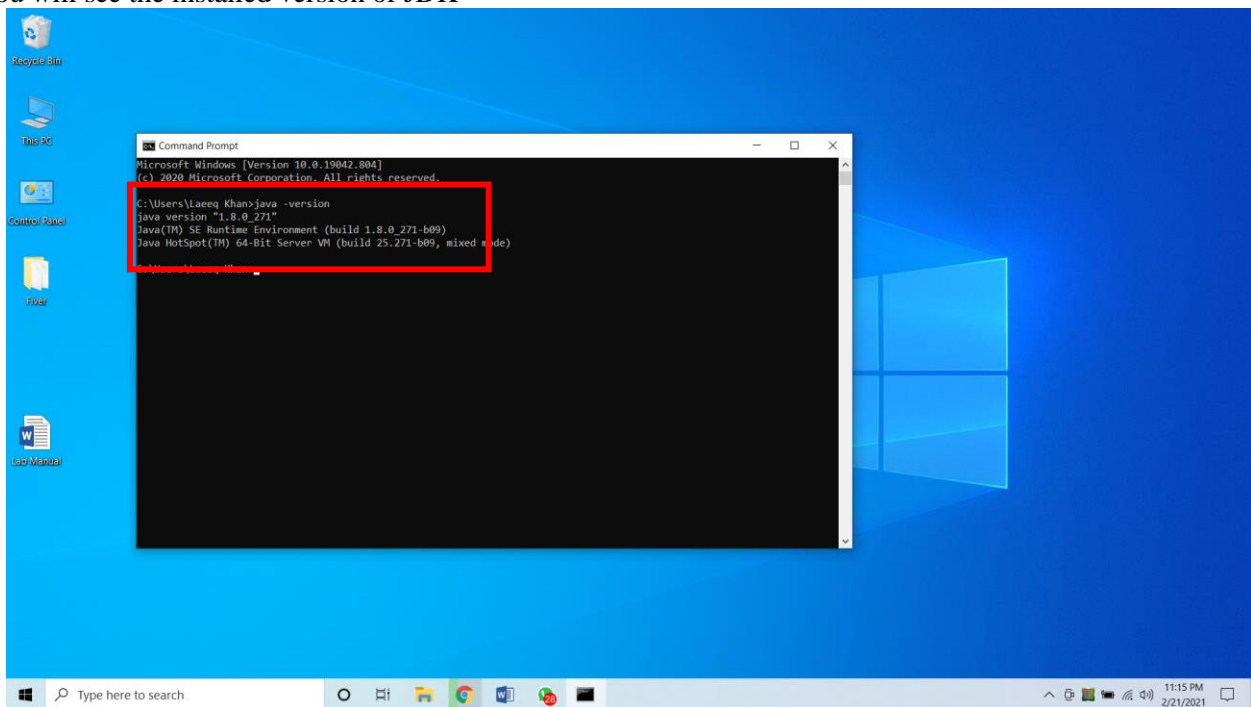


Click on OK button buttons of all open windows.
Now Open CMD

Type Java -Version command and hit enter

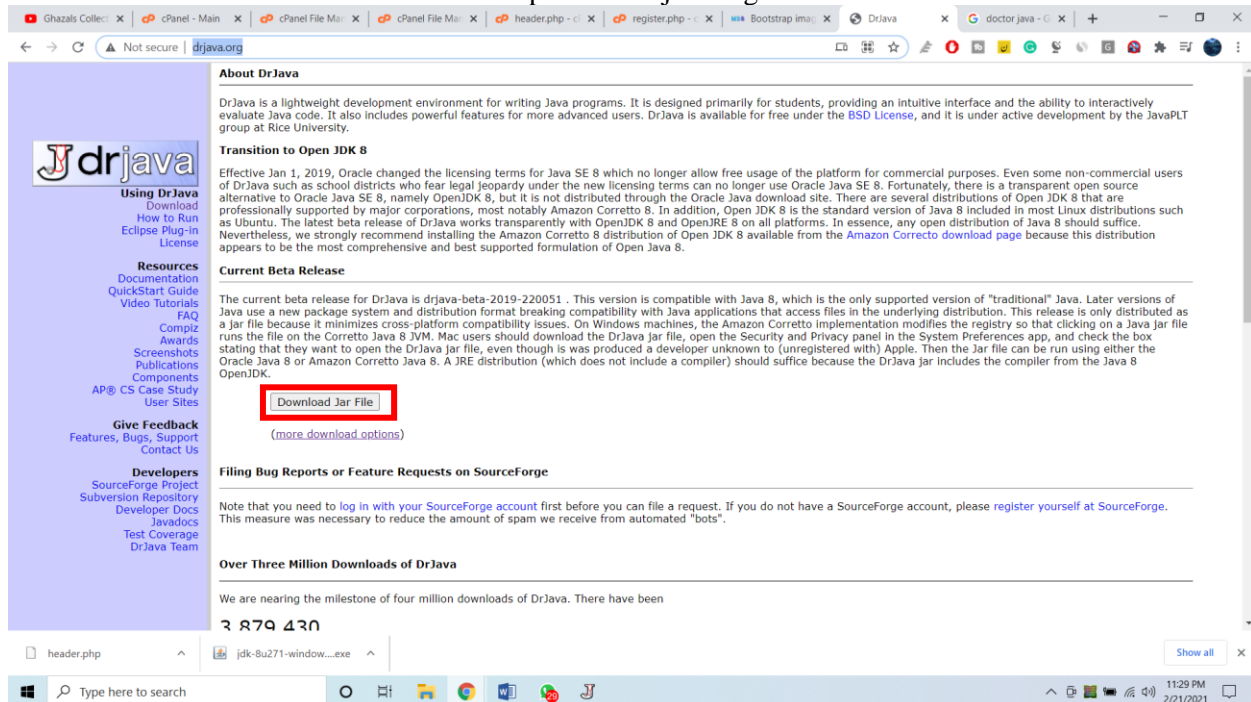


Here you will see the installed version of JDK

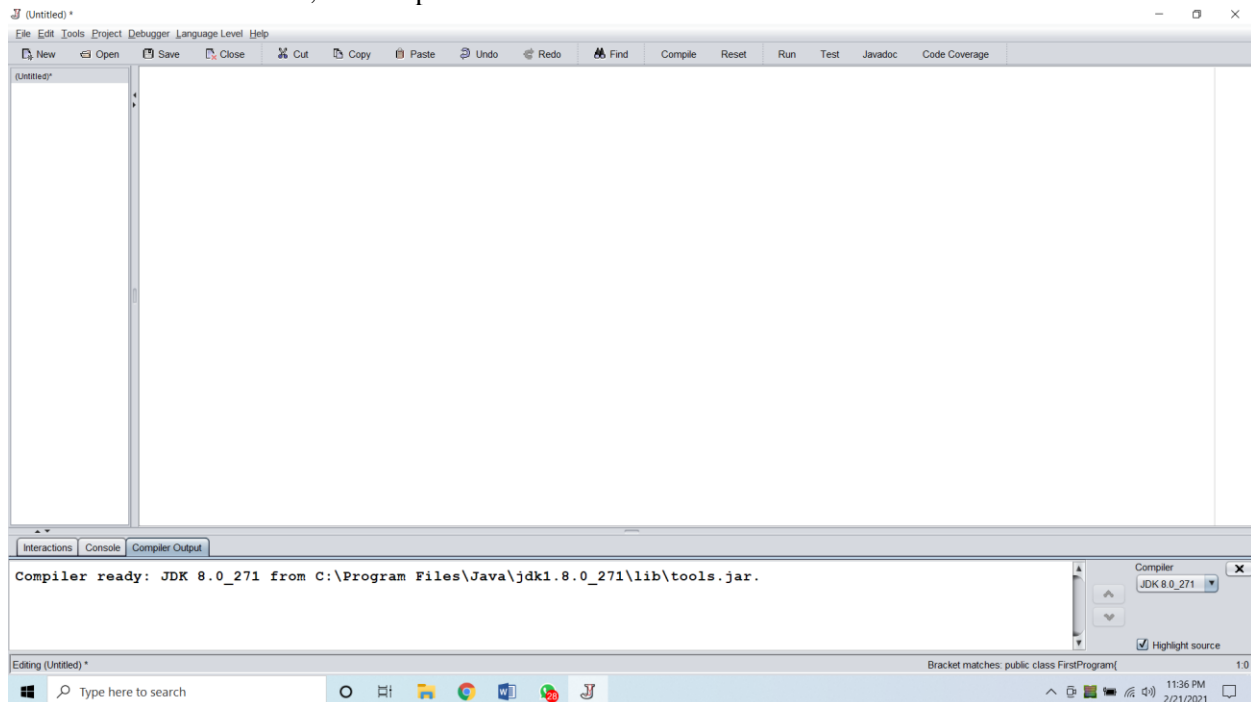


Download DrJava IDE from following link

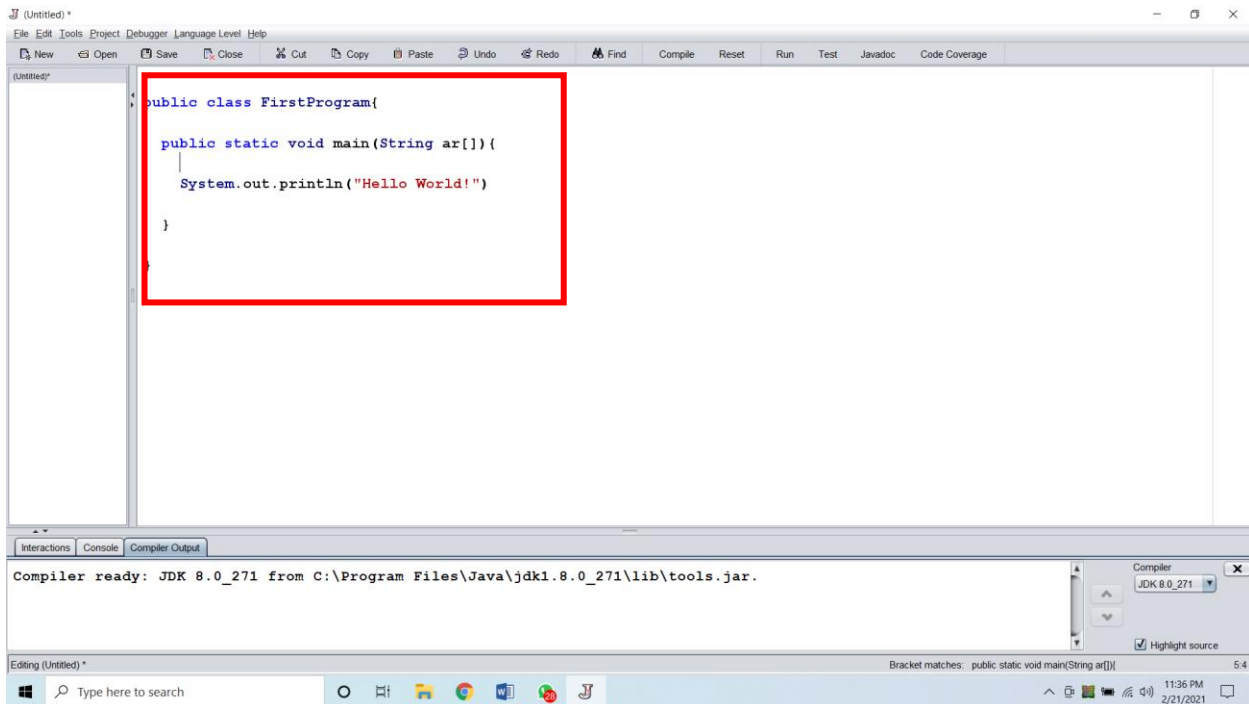
<http://www.drjava.org/>



Double click on downloaded file, it will open the IDE

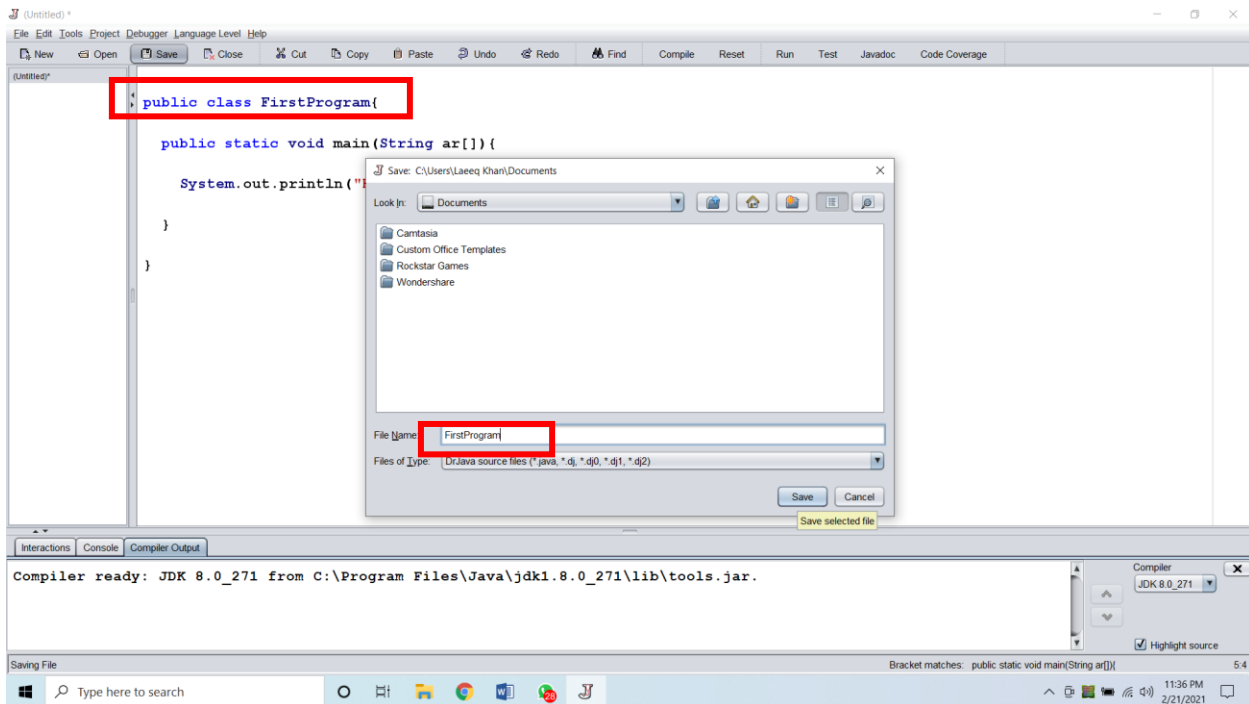


Write your first program in IDE

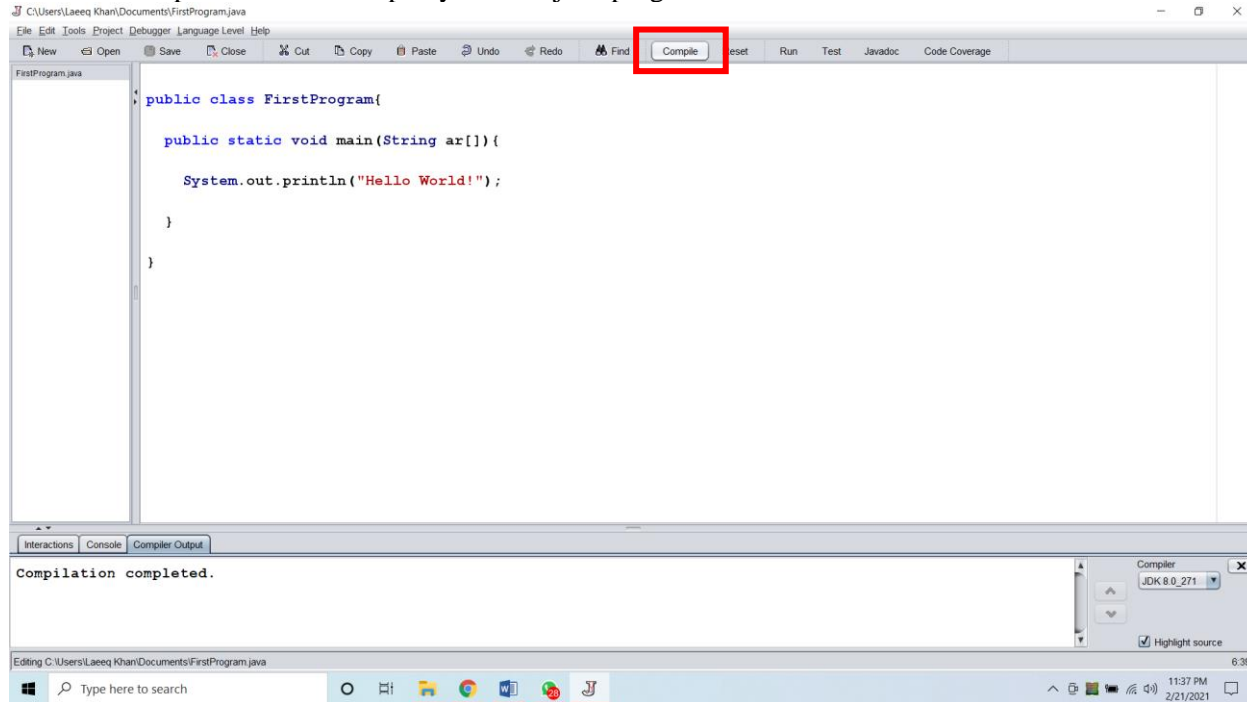


Click on save button to save your file.

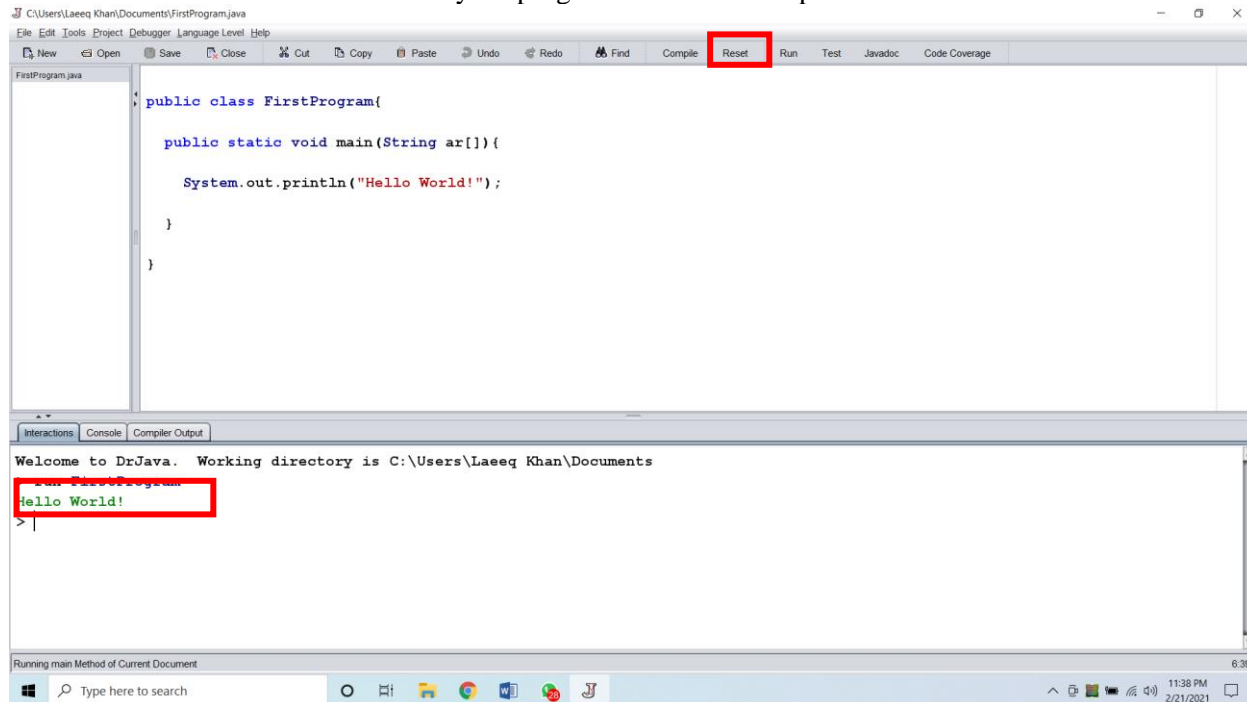
Note: Your Class name and File name should be same.



Click on Compile button to compile your first java program



After that click on Run button to Run your program and see the output window



Examples:

Example 1: Write a Program to display integer value

C++	Java Code
<pre>// header file "iostream" to display output #include <iostream> using namespace std; // C++ main Program for execution int main() { // declare variable with int datatype int num1 = 70;</pre>	<pre>public class FirstProgram { public static void main(String [] args) //main method for program execution { int num = 70; System.out.println("Welcome to Object Orientated</pre>

<pre>// prints the string enclosed in double quotes cout << "Welcome to Programming Fundamental" << endl; cout << "int: " << num1 << endl; // print integer // exit status of main() function return 0; }</pre>	<pre>Programming"); System.out.println("Number Entered is: " + num); } }</pre>
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Example 2: Input for Integer

Write a program for feet to inch's conversion such that user input feet, manipulate it and display the inch's value

C++	Java Code
<pre>#include <iostream> using namespace std; int main() { // declaration of two double int value, newvalue; cout << "Welcome to Feet to inch's Unit Convertor" << endl; cout << "Enter the Value in feet: " << endl; cin >> value; newvalue = value * 12; cout << "Converted Value in inch's' is : "<< newvalue << endl; return 0; }</pre>	<pre>import java.util.Scanner; public class FirstProgram { public static void main(String[] args) { // Creates a reader instance which takes // input from standard input - keyboard Scanner reader = new Scanner(System.in); System.out.print("Enter a number in feet: "); // nextInt() reads the next integer from the keyboard int feet = reader.nextInt(); int inch = feet * 12; System.out.println("Converted Value in inch's' is: " + inch); } }</pre>

Example 3: Input for Double

Write a program to calculate area of triangle

C++	Java Code
<pre>#include <iostream> using namespace std; int main(){ system("cls"); double height , base; double t_area; cout << "Enter Height of triangle" << endl; cin >> height; cout << "Enter BASE of triangle" << endl; cin >> base; //area of triangle = 1/2 (height * base) t_area = (0.5)*height*base; cout << "Area of Triangle is: " << t_area << endl; return 0; }</pre>	<pre>import java.util.Scanner; public class FirstProgram { public static void main(String[] args) { Scanner scanner = new Scanner(System.in); System.out.println("Enter the width of the Triangle:"); double base = scanner.nextDouble(); System.out.println("Enter the height of the Triangle:"); double height = scanner.nextDouble(); //Area = (width*height)/2 double area = (base* height)/2; System.out.println("Area of Triangle is: " + area); } }</pre>

Example 4: Input for String

Write a program that display string input to user.

C++	Java Code
<pre>#include <iostream> #include <string.h> using namespace std; // Driver code int main() { string first_name, last_name , resultant_string; cout << "Enter Your First Name " ; cin >> first_name; cout << "Enter Your Last Name " ; cin >> last_name; resultant_string = "Hello, I am " + first_name + " " + last_name ; cout << "My Introduction: " << resultant_string; return 0; }</pre>	<pre>public static void main(String[] args) { Scanner scanner = new Scanner(System.in); System.out.println("Enter Your First Name"); String firstName = scanner.next(); System.out.println("Enter Your Last Name:"); String lastName = scanner.next(); //Area = (width*height)/2 System.out.println("My Name is: " + firstName + " " + lastName + "."); }</pre>

Example 5: Conditional Statements

Write a program for currency conversion (Dollar to Pkr) if value entered by user is positive integer

C++	Java Code
<pre>#include <iostream> using namespace std; int main() { int value, newvalue; cout << "Welcome to Dollar to PKR Unit Convertor" << endl; cout << "Enter the Value in PKR: " ; cin >> value; if (value > 0) { newvalue = value * 160; cout << "Converted Value in Pk is : " << newvalue << endl; } else { cout << "Enter Valid (Greater than 0) value"; } return 0; }</pre>	<pre>public static void main(String[] args) { Scanner scanner = new Scanner(System.in); System.out.println("Enter Currency Value (In Dollar) "); int user_input = scanner.nextInt(); if (user_input > 0) { System.out.println("Converted Value is " + user_input * 160 + "."); } else { System.out.println("You have entered invalid value."); } }</pre>

Example 6: Loops

Write a program that print all even positive integers till n (input entered by user) using loop.

C++	Java Code
<pre>#include <iostream> using namespace std; int main() {</pre>	<pre>public static void main(String[] args) { Scanner scanner = new Scanner(System.in); System.out.println("Enter the number");</pre>

<pre> int i, n; cout << "Print all even numbers till: "; cin >> n; cout << "Even numbers from 1 to n are:" ; for(i=1; i<=n; i++) { if(i%2 == 0) { cout << i << " "; } } return 0; } </pre>	<pre> int number = scanner.nextInt(); System.out.print(" All positive even integers are "); for (int i = 1; i <= number; i++) { //if number%2 == 0 it means its an even number if (i % 2 == 0) { System.out.print(i + " "); } } } </pre>
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Example 7: Functions

Write a program that inputs two numbers in main() function, passes these numbers to a function named findMax which takes two parameters as inputs and has the return type int. The function will return the maximum number. This maximum number should be displayed in main function.

C++	Java Code
<pre> #include <iostream> using namespace std; int findMax(int a, int b) { if (a > b) { return a; } else { return b; } } int main() { int number1, number2; cout << "Enter First number>> "; cin >> number1; cout << "Enter Second number>> "; cin >> number2; cout << "max is: " << findMax(number1, number2); return 0; } </pre>	<pre> public static int findMax(int a , int b){ if (a > b){ return a; } else { return b; } } public static void main(String[] args) { Scanner scanner = new Scanner(System.in); System.out.println("Enter the number 1"); int number1 = scanner.nextInt(); System.out.println("Enter the number 2"); int number2 = scanner.nextInt(); int max = findMax(number1, number2); System.out.print(" Maximum Number is " + max); } </pre>

Example 8: 1D Arrayss

Write a program that uses four arrays **numbers**, **squares**, **and cubes** and **sums** each consisting of 5 elements. The **numbers** array stores the values of its indexes, the **squares** array stores the squares of its indexes, the **cubes** array stores the cubes of its indexes and **sums** array stores the sum of corresponding indexes of three arrays. The program should display the values of all arrays and the total of all values in **sums** array.

C++	Java Code
<pre> #include<iostream> using namespace std; </pre>	<pre> public static void main(String[] args) { int n=-1; Scanner scanner = new Scanner(System.in); </pre>

<pre> int main(){ cout << "Enter the size of array: "; int size; cin >> size; int arr[size]; cout << "Enter Array Elements: "; for(int i = 0; i<size; i++){ cin >> arr[i]; } int min = 0, max = 0; int diff = 0; for(int i = 0; i<size; i++){ for(int each = 0; each<size; each++){ if(arr[i] != arr[each]){ diff = arr[i] - arr[each]; if(diff<0){ diff *= -1; } if(max<diff){ min = max; max = diff; } else if(diff<min){ min = diff; } } } } cout << "Maximum Difference: " << max << endl; cout << "Minimum Difference: " << min << endl; return 0; } </pre>	<pre> System.out.print("Enter no. of elements you want in array:"); n = scanner.nextInt(); int arr[] = new int[n]; int square[] = new int[n]; int cube[] = new int[n]; int sums[] = new int[n]; System.out.println("Enter all the elements:"); for(int i = 0; i < n; i++) { arr[i] = scanner.nextInt(); square[i] = arr[i]*arr[i]; cube[i] = arr[i]*arr[i]*arr[i]; sums[i] = arr[i]+ square[i]+cube[i]; } System.out.print(" Input array is "); for(int i = 0; i < n; i++) { System.out.print(">>" +arr[i]); } System.out.print(" Square array is "); for(int i = 0; i < n; i++) { System.out.print(">>" +square[i]); } System.out.print(" Cubic array is "); for(int i = 0; i < n; i++) { System.out.print(">>" +cube[i]); } System.out.print(" Sum array is "); for(int i = 0; i < n; i++) { System.out.print(">>" +sums[i]); } } </pre>
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Home Task:

1. Write a Program to calculate grade of students. Following program should take the obtain marks of students (minimum 8 subject) and display its average marks and grade.
2. Write a program to instruct players about weather. Ask user to know whether it is raining outside or not. If it is, display "Take Rest" otherwise ask temperature (in Fahrenheit) from user. If temperature is 80 or more than display a message "go and play" otherwise display a message "its too cold outside"
3. Write a program to swap two integer number without using third variable
4. Write a program to reverse a given sentence (he is a programmer -> programmer a is he)
5. Write a program that will withdraw money from an ATM Machine. A user can withdraw money that is multiple of 500. If the user enter amount, which is multiple of 500 it will display message that says "Collect your money" otherwise display a message that says "you have entered invalid amount, kindly entered in multiple of 500".

6. Write a program that inputs a number in main() function, passes the number to a function named calculateFactorial which takes an integer as input and finds the factorial of the given input. Think of the return type of this function. Main function will display the factorial of that number.
7. Sort the array of 10 integers taken from user.
8. **Number Validator:** Take a string from the user and tells whether a string is number or not
9. **Palindrome** A palindrome is a word, number, phrase, or other sequence of characters, which reads the same backward as forward, such as madam, racecar or 91719 etc. Write a program that take c-string from user and check whether the given array is palindrome or not. The program will consist of a function with Boolean type. the structure of function is

bool isPalindrome(char arr[])

Enter the string: Madam

Output: It's a palindrome
10. Write a program to calculate age (Take dob from user and compare it with current date and display day month and year)