

Program1

```
import java.util.Scanner;
class Student {
String name;
int mark1, mark2, mark3;
void displayDetails() {
double average = (mark1 + mark2 + mark3) / 3.0;
char grade = average >= 90 ? 'A' : average >= 80 ? 'B' : average
>= 70 ? 'C' : average >=
60 ? 'D' : 'F';
System.out.println("Name: " + name + ", Average: " + average + ", Grade: " + grade);
}
}

public class StudentDetails {
public static void main(String[] args) {
Scanner scanner = new Scanner(System.in);
Student student = new Student();
System.out.print("Enter name: ");
student.name = scanner.nextLine();
System.out.print("Enter 3 marks: ");
student.mark1 = scanner.nextInt();
student.mark2 = scanner.nextInt();
student.mark3 = scanner.nextInt();
student.displayDetails();
scanner.close();
}
}

Output
```

The screenshot shows the NetBeans IDE interface. On the left, the Project Explorer displays a project structure with packages like com.mycompany.lengthandgravity, com.mycompany.program1, and com.mycompany.student. The Source Packages section under com.mycompany.student contains Student.java and StudentDetails.java. The code editor window shows StudentDetails.java with the following content:

```

1  /*
2   * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change
3   * this license
4   *
5   * package com.mycompany.student;
6   *
7   */
8   /**
9    * Sauthor iBSCCSA46
10   */
11  import java.util.Scanner;
12  class Student {
13     String name;
14     int mark1,mark2,mark3;
15     void displayDetails() {
16         double average = (mark1+mark2+mark3)/3.0;
17         char grade = average>=90?'a':average>=80?'b':average>=70?'c':average>=60?'d': 'r';
18         System.out.println("Name :" +name+", average :" +average+", grade :" +grade);
19     }
20 }
21 public class StudentDetails{
22     public static void main (String[]args){
23         Scanner scanner = new Scanner(System.in);
24         Student student=new Student();
25         System.out.print("Enter name:");
26         student.name=scanner.nextLine();
27         System.out.print("Enter 3marks:");
28         student.mark1=scanner.nextLine();
29         student.mark2=scanner.nextLine();
30         student.mark3=scanner.nextLine();
31         scanner.nextLine();
32         student.displayDetails();
33         scanner.close();
34     }
35 }

```

The Output window at the bottom shows compilation errors:

```

com/mycompany/student/Student.java:[24,29] cannot find symbol
symbol:   class scanner
location: class com.mycompany.student.StudentDetails
com/mycompany/student/Student.java:[29,22] cannot find symbol
symbol:   method nextInt()
location: variable scanner of type java.util.Scanner
com/mycompany/student/Student.java:[30,22] cannot find symbol
symbol:   method nextInt()
location: variable scanner of type java.util.Scanner
com/mycompany/student/Student.java:[31,22] cannot find symbol
symbol:   method nextInt()
location: variable scanner of type java.util.Scanner
5 errors

```

Program2

```

package com.mycompany.mavenproject1;
import java.util.*;
class Mavenproject1{
public static void main(String args[]){
Scanner sc = new Scanner(System.in);
final double Pi = 22/7;
System.out.println("Enter the length and acceleration due to gravity");
int l = sc.nextInt();
int g = sc.nextInt();
double t = 2*Pi*Math.sqrt(l/g);
System.out.println("The time period of the pendulum is "+t);

}
Output

```

```
Output - Run (mavenproject1)

--- exec:3.5.1:exec (default-cli) @ mavenproject1 ---
Enter the length and acceleration due to gravity
12
4
The time period of the pendulum is 10.392304845413264
-----
BUILD SUCCESS
-----
Total time: 6.704 s
Finished at: 2025-12-04T14:23:26+05:30
-----
```

Program3

The screenshot shows an IDE interface with a code editor and an output window.

Code Editor (Source tab):

```
1 package com.mycompany.mavenproject5;
2 import java.util.Scanner;
3
4 public class Mavenproject5 {
5     public static void main(String[] args) {
6         Scanner scanner = new Scanner(System.in);
7         System.out.print("Enter the first string:");
8         String str1 = scanner.nextLine();
9         System.out.print("Enter the second string:");
10        String str2 = scanner.nextLine();
11        System.out.println("\nChoose a string operation:");
12        System.out.println("1. Find Length");
13        System.out.println("2. Convert to Uppercase");
14        System.out.println("3. Convert to Lowercase");
15        System.out.println("4. Concatenate Strings");
16        System.out.println("5. Check if Substring Exists");
17        System.out.println("6. Check if String is Empty");
18        System.out.println("7. Exit");
19        while(true){
20            System.out.print("\nEnter your choice:");
21            int choice = scanner.nextInt();
22            scanner.nextLine();
23            switch (choice) {
24                case 1:
25                    System.out.println("1. Length of first string:" + str1.length());
26                    System.out.println("1. Length of second string:" + str2.length());
27                    break;
28            }
29        }
30    }
31 }
```

Output Window:

Run (mavenproject5) x Run (mavenproject5) x

```
Recompiling the module because of changed source code.
I/O error deleting the annotation processing generated files: C:\Users\1BSCCSA13\Documents\
Compiling 1 source file with javac [debug release 25] to target\classes

--- exec:3.5.1:exec (default-cli) @ mavenproject5 ---
Enter the first string:harini
Enter the second string:ramesh

Choose a string operation:
1. Find Length
```

Program4

The screenshot shows a Java IDE interface with several tabs at the top: hlo.jsx, newreactjs.jsx, newjadeTemplate.jade, Hlo.java, Mavenproject1.java, and Discount.java. The Mavenproject1.java tab is active, displaying the following Java code:

```
1 package com.mycompany.mavenproject1;
2 import java.util.*;
3
4 class Mavenproject1{
5     public static void main(String args[]){
6         Scanner sc = new Scanner(System.in);
7         System.out.println("Enter the basic pay");
8         int pay = sc.nextInt();
9         double da=0.3*pay;
10        double hra=0.15*pay;
11        double pf=0.125*pay;
12        double gross=pay+da+hra;
13        double net=gross-pf;
14        System.out.println("Gross Pay="+gross);
15        System.out.println("net pay="+net);
16    }
17 }
```

Below the code editor is a terminal window titled "Output - Run (mavenproject1)". It shows the following output:

```
Enter the basic pay
23000
Gross Pay=33350.0
net pay=30475.0
-----
BUILD SUCCESS
-----
Total time: 7.503 s
Finished at: 2025-12-09T16:52:14+05:30
-----
```

Program5

The screenshot shows a Java development environment with the following details:

Code Editor (Source tab):

```
1 package com.mycompany.discount;
2 import java.util.*;
3 class Discount{
4     public static void main(String args[]){
5         Scanner sc = new Scanner(System.in);
6         System.out.println("Enter the Printed Price"); int p
7         = sc.nextInt();
8         double d = 0.1 * p;
9         double dp = p - d;
10        double gst = 0.06 * dp;
11        double amount = dp + gst;
12        System.out.println("The discount is "+d +"GST is "+gst);
13        System.out.println("The total amount is "+amount);
14    }
15 }
```

Output Terminal (Output - Run (discount) tab):

```
com.mycompany.discount.Discoun > main >
[Run] Enter the Printed Price
89
[Run] The discount is 8.9
[Run] GST is 24.80599999999999
[Run] The total amount is 84.90599999999999
-----
[BUILD SUCCESS]
-----
Total time: 9.766 s
Finished at: 2025-12-09T16:40:28+05:30
-----
```

Program6

The screenshot shows an IDE interface with two tabs: "Shapejava" and "Inheritance.java". The "Inheritance.java" tab is active, displaying the following Java code:

```
private double length,width;
public Rectangle(double length,double width){
    this.length=length;
    this.width=width;
}
@Override
public double calculateArea(){
    return length*width;
}
class square extends shape{
    private double side;
    public square(double side){
        this.side=side;
    }
@Override
public double calculateArea(){
    return side*side;
}
public class Inheritance{
    public static void main(String[]args){
        shape circle=new Circle(2);
        shape rectangle=new Rectangle(4,6);
        shape square=new square(4);
        System.out.println("Circle Area:"+circle.calculateArea());
        System.out.println("rectangle area:"+rectangle.calculateArea());
        System.out.println("square area:"+square.calculateArea());
    }
}
```

The code defines three classes: Shape, Circle, and Rectangle, which all implement the calculateArea() method. The Inheritance class demonstrates how to create objects of these classes and print their areas.

Below the code editor is the "Output - Run (Inheritance)" panel, which shows the following build log:

```
Compiling 1 source file with javac [debug release 25] to target\classes
--- exec:3.5.1:exec (default-cli) @ Inheritance ---
Circle Area:12.56
rectangle area:24.0
square area:16.0
-----
BUILD SUCCESS
-----
Total time: 1.735 s
```

Program7

The screenshot shows an IDE interface with two main panes. The top pane displays the source code for a Java class named `INTEREST`. The code uses `Scanner` to read input from the user and `System.out.println` to output the results. It calculates the amount after three years by applying a 5% annual interest rate to the previous year's total. The bottom pane shows the output of the run command, which includes the command executed, the user input (300), and the program's output (Interest for the first year is 15.0, Interest after second year is 15.75, Amount after three years is 347.2875). It also shows the build success message and the total execution time.

```
1 package com.mycompany.interest;
2 import java.util.*;
3 class INTEREST{
4     public static void main(String args[]){
5         Scanner sc = new Scanner(System.in);
6         System.out.println("Enter the sum of money");
7         double sum = sc.nextInt();
8         double in1 = sum * 5* 1/100.0;
9         System.out.println("Interest for the first year is "+in1); sum
10        += in1;
11        double in2 = sum * 5 * 1 / 100.0;
12        System.out.println("Interest after second year is "+in2); sum
13        += in2;
14        double in3 = sum * 5 * 1/100.0;
15        sum += in3;
16        System.out.println("Amount after three years is "+sum);
17    }
18 }
```

Output - Run (INTEREST) ×
compiling 1 source file with javac -d target/classes
--- exec:3.5.1:exec (default-cli) @ INTEREST ---
Enter the sum of money
300
Interest for the first year is 15.0
Interest after second year is 15.75
Amount after three years is 347.2875

BUILD SUCCESS

Total time: 12.101 s
Finished at: 2025-12-17T17:07:35+05:30

Program8

The screenshot shows an IDE interface with two main panes. The top pane is titled 'Interfaces.java' and contains the following Java code:

```
1 package com.mycompany.interfaces;
2 import java.util.Scanner;
3 interface Calculator {
4     double add(double a, double b);
5     double subtract(double a, double b);
6     double multiply(double a, double b);
7     double divide(double a, double b);
8 }
9 class SimpleCalculator implements Calculator {
10    @Override
11    public double add(double a, double b) {
12        return a + b;
13    }
14    @Override
15    public double subtract(double a, double b) {
16        return a - b;
17    }
18    @Override
19    public double multiply(double a, double b) {
20        return a * b;
21    }
22    @Override
23    public double divide(double a, double b) {
24        if (b == 0) {
25            System.out.println("Error: Division by zero is not allowed");
26            return Double.NaN;
27        }
28        return a / b;
29    }
30 }
31 public class Interfaces {
```

The bottom pane is titled 'Output - Run (interfaces)' and shows the execution results:

```
Enter the first number:45
Enter the second number:67
Results:
Addition :112.0
Subtraction:-22.0
Multiplication:3015.0
Division:0.6716417910447762
BUILD SUCCESS
Total time: 19.361 s
Finished at: 2025-12-17T16:31:19+05:30
```

Program9

The screenshot shows an IDE interface with two tabs at the top: 'Interfaces.java' and 'Program4.java'. The 'Program4.java' tab is active, displaying the following Java code:

```
1 package com.mycompany.program4;
2 import java.util.*;
3
4 class Program4 {
5     public static void main(String args[]) {
6         Scanner sc = new Scanner(System.in);
7         System.out.println("Enter the Cost Price");
8         int price = sc.nextInt();
9         double dis1 = 0.3 * price;
10        double price2 = price - dis1;
11        System.out.println("Price after 30% discount is " + price2);
12        double dis2 = 0.2 * price;
13        double price3 = price - dis2;
14        double dis3 = 0.1 * price3;
15        double price4 = price3 - dis3;
16        System.out.println("Price after successive discounts is " + price4);
17    }
18 }
```

Below the code editor is a 'Output - Run (program4)' window. It shows the compilation process and the execution output:

```
Output - Run (program4) ×
Recompiling the module because of changed source code.
Compiling 1 source file with javac [debug release 25] to target\classes
--- exec:3.5.1:exec (default-cli) @ program4 ---
Enter the Cost Price
670
Price after 30% discount is 469.0
Price after successive discounts is 482.4
-----
BUILD SUCCESS
-----
Total time: 8.850 s
Finished at: 2025-12-17T16:41:26+05:30
-----
```

Program10

The screenshot shows the NetBeans IDE interface. The top window displays a Java source code file named `Exceptionhandling.java`. The code implements a `Scanner` to read two integers from the user and performs four arithmetic operations: addition, subtraction, multiplication, and division. It uses a try-catch block to handle `ArithmeticException`, printing an error message if one occurs. The bottom window, titled "Output - Run (Exceptionhandling)", shows the console output of the program. The output includes the results of the arithmetic operations (Addition: 79, Subtraction: 11, Multiplication: 1530, Division: 1) and a final message "Execution Completed!". Below the output, the build log shows "BUILD SUCCESS" and a total execution time of 9.325 s.

```
/*
 * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change this license
 */
package com.mycompany.exceptionhandling;

/**
 * @author lBSCCSA05
 */
import java.util.Scanner;
public class Exceptionhandling{
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter first num:");
        int num1 = scanner.nextInt();
        System.out.print("Enter second num:");
        int num2 = scanner.nextInt();
        System.out.println("\nResults:");

        try {
            System.out.println("Addition: " + (num1 + num2));
            System.out.println("Subtraction: " + (num1 - num2));
            System.out.println("Multiplication: " + (num1 * num2));
            System.out.println("Division: " + (num1 / num2));
        } catch (ArithmeticException e) {
            System.out.println("Error: " + e.getMessage());
        } finally {
            System.out.println("\nExecution Completed!");
        }
    }
}
```

```
Output - Run (Exceptionhandling)
Addition:79
Subtraction:11
Multiplication: 1530
Division:1

Execution Completed!
BUILD SUCCESS
Total time: 9.325 s
```

Program11

```
package com.mycompany.compound;

/*
 * @author lBSCCSA05
 */
import java.util.*;
class Compound{
public static void main(String args[]){
Scanner sc = new Scanner(System.in);
System.out.println("Enter the sum of money");
double sum = sc.nextInt();
double in1 = sum * 5* 1/100.0;
System.out.println("Interest for the first year is \u20B9"+in1); sum
+= in1;
double in2 = sum * 5 * 1 / 100.0;
System.out.println("Interest after second year is \u20B9"+in2); sum
+= in2;
double in3 = sum * 5 * 1 /100.0;
sum += in3;
System.out.println("Amount after three years is \u20B9"+sum);
}
}
```

```
out - Run (compound)
--- exec:3.5.1:exec (default-cli) @ compound ---
Enter the sum of money
20000
Interest for the first year is ?1000.0
Interest after second year is ?1050.0
Amount after three years is ?23152.5
-----
BUILD SUCCESS
```

Program12

The screenshot shows a Java IDE interface with a code editor and a terminal window.

Code Editor:

```
1 package math_operations;
2 // Calculator class in the
3 public class Object{
4     public int add(int a, int b) {
5         return a + b;
6     }
7     public int subtract(int a, int b) {
8         return a - b;
9     }
10    public int multiply(int a, int b) {
11        return a * b;
12    }
13    public double divide(int a, int b) {
14        if (b != 0) {
15            return a / b;
16        } else {
17            System.out.println("Cannot divide by zero");
18            return Double.NaN;
19        }
20    }
21 }
22
23 // MathUtils class in the math_operations package
24 package math_operations;
25 public class Object{
26     public double calculateSquareRoot(double num) {
27         if (num >= 0) {
28             return Math.sqrt(num);
29         } else {
30             System.out.println("Cannot calculate square root of a negative number");
31             return Double.NaN;
32         }
33     }
34 }
35
36 // Main class for testing the math operations package
37 public class Object{
38     public static void main(String[] args) {
39 }
40 }
```

Terminal Output:

```
Output - Run (Inheritance)
COMPILATION ERROR :
-----
com/mycompany/inheritance/object.java:[24,1] class, interface, enum, or record expected
1 error
-----
BUILD FAILURE
-----
Total time: 1.475 s
Finished at: 2025-12-29T13:14:04+05:30
```

Program13

The screenshot shows a Java application running in an IDE. The code editor displays a file named `Exceptionhandling.java` with the following content:

```
1  /*
2  * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change this license
3  */
4
5  package com.mycompany.exceptionhandling;
6
7  /**
8  *
9  * @author lBSCCSA05
10 */
11 import java.util.Scanner;
12 public class Exceptionhandling{
13     public static void main(String[] args) {
14         Scanner scanner = new Scanner (System.in);
15         System.out.print("Enter first num:");
16         int num1 = scanner.nextInt();
17         System.out.print("Enter second num:");
18         int num2 = scanner.nextInt();
19         System.out.println("\nResults:");
20
21         try {
22             System.out.println("Addition:" + (num1 + num2));
23             System.out.println("Subtraction:" + (num1 - num2));
24             System.out.println("Multiplication: " + (num1 * num2));
25             System.out.println("Division:" + (num1 / num2));
26         } catch (ArithmaticException e) {
27             System.out.println("Error:"+e.getMessage());
28         } finally {
29             System.out.println("\nExecution Completed!");
30         }
31     }
32 }
```

The terminal window below shows the output of the program:

```
tput - Run (Exceptionhandling)
    Addtion:79
    Subtraction:11
    Multiplication: 1530
    Division:1

    Execution Completed!
-----
BUILD SUCCESS
-----
Total time: 9.325 s
```

Program14

```
package com.mycompany.compound;

/*
 * 
 * @author lBSCCSA05
 */
import java.util.*;
class Compound{
public static void main(String args[]){
Scanner sc = new Scanner(System.in);
System.out.println("Enter the sum of money");
double sum = sc.nextInt();
double in1 = sum * 5* 1/100.0;
System.out.println("Interest for the first year is \u20B9"+in1); sum
+= in1;
double in2 = sum * 5 * 1 / 100.0;
System.out.println("Interest after second year is \u20B9"+in2); sum
+= in2;
double in3 = sum * 5 * 1 /100.0;
sum += in3;
System.out.println("Amount after three years is \u20B9"+sum);
}
}
```

out - Run (compound)

```
--- exec:3.5.1:exec (default-cli) @ compound ---
Enter the sum of money
20000
Interest for the first year is ?1000.0
Interest after second year is ?1050.0
Amount after three years is ?23152.5
-----
BUILD SUCCESS
```

Program15

The screenshot shows a Java application running in an IDE. The top half is a code editor with the following Java code:

```
1  /*
2   * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change this license
3   * Click nbfs://nbhost/SystemFileSystem/Templates/Classes/Class.java to edit this template
4   */
5  package com.mycompany.compound;
6
7  /**
8   * 
9   * @author lBSCCSA05
10  */
11 class shares{
12     public static void main(String args[]){
13         int num = (2000 * 100)/(10 * 10);
14         System.out.println("Number of shares currently held is "+num); int
15         want = 3000 - num;
16         System.out.println("No. of Shares needed to reach 3000 is"+want);
17     }
18 }
19
```

The bottom half is a terminal window titled "Output - Run (compound)" showing the execution of the program:

```
--- exec:3.5.1:exec (default-cli) @ compound ---
Enter the sum of money
15000
Interst for the first year is ?750.0
Interst after second year is ?787.5
Amount after three years is ?17364.375
-----
BUILD SUCCESS
```

Program16

```
/*
 * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change this license
 */

package com.mycompany.time;

/**
 *
 * @author 1BSCCSA05
 */
import java.util.*;
class Time{
public static void main(String args[]){
Scanner sc = new Scanner(System.in);
System.out.println("Enter time in seconds"); int
sec = sc.nextInt();
int hour = sec/3600;
sec = sec % 3600;
int min = sec / 60;
sec = sec % 60;
System.out.println(hour+" Hours "+min+"Minutes "+sec+" Seconds");
}
}
```

```
t - Run (time)
Compiling 1 source file with javac [debug release 25] to target\classes
] --- exec:3.5.1:exec (default-cli) @ time ---
Enter time in seconds
2456
· 0 Hours 40Minutes 56 Seconds
-----
BUILD SUCCESS
```

Program17

The screenshot shows a Java code editor and a terminal window. The code editor displays a Java file named `SWAP.java` with the following content:

```
1  /*
2  * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change this license
3  */
4
5  package com.mycompany.swap;
6
7  /**
8  *
9  * @author LBSCCSA05
10 */
11 import java.util.*;
12 class SWAP{
13     public static void main(String args[]){
14         Scanner sc = new Scanner(System.in);
15         System.out.println("Enter value of A");
16         int a
17         = sc.nextInt();
18         System.out.println("Enter value of B");
19         int b
20         = sc.nextInt();
21         a = a+b;
22         b = a-b;
23         a = a-b;
24         System.out.println("A = "+a+"\nB =" +b);
25     }
26 }
```

The terminal window below shows the execution of the program:

```
Output - Run (SWAP)
[1] 100% 0:00:00.000 128x32 0.000ms
▶ Enter value of A
56
▶ Enter value of B
34
▶ A = 34
B =56
-----
BUILD SUCCESS
```

Program18

```
6  /**
7  * 
8  * @author 1BSCCSA46
9  */
10
11 import java.io.*;
12 public class Linked{
13     public static void main(String[] args) {
14         try (FileOutputStream fos = new FileOutputStream("file.txt")) {
15             fos.write("Hello, World!".getBytes());
16         } catch (IOException e) {
17             System.out.println("Error:" + e.getMessage());
18         }
19     }
20 }
21
22
```



```
com.mycompany.linked.Linked >
Output - Run (linked) ×
skip non existing resourceDirectory C:\Users\1BSCCSA46\Documents\NetBeansProjects\linked\src\main\resources
--- compiler:3.13.0:compile (default-compile) @ linked ---
Recompiling the module because of changed source code.
Compiling 1 source file with javac [debug release 25] to target\classes
--- exec:3.5.1:exec (default-cli) @ linked ---
-----
BUILD SUCCESS
-----
Total time: 3.556 s
Finished at: 2026-01-03T16:11:35+05:30
-----
```

Program19

The screenshot shows the NetBeans IDE interface with the following details:

- Source Editor:** Displays the `Stack.java` file. The code implements a stack using an array and provides five operations: Push, Pop, Peek, Display Stack, and Exit.
- Output Window:** Shows the compilation process and an error message.
 - Resources: Skipped non-existing resource directory `C:\Users\1BSCCSA46\Documents\NetBeansProjects\stack\src\main\resources`.
 - Compiler: Compiled `Stack.java` to `target\classes`.
 - A warning: `Recompiling module because of changed source code.`
 - An error: `Compiling 1 source file with javac (debug release 28) to target\classes`
 - COMPILATION ERROR :**
 - `com/mycompany/stack/Stack.java:[14,7] type com.mycompany.stack.Stack does not take parameters`
 - `com/mycompany/stack/Stack.java:[14,34] cannot infer type arguments for com.mycompany.stack.Stack`