Lab Task 4: Code Inception

4.1. Select 1 error checklist.

1. Multiway branches exceeded?
2. Will each loop terminate?
3. Will program terminate?
4. Any loop bypasses because of entry conditions?
5. Are possible loop fall-throughs correct?
6. Off-by-one iteration errors?
7. DO/END statements match?
8. Any nonexhaustive decisions?
9. Any textual or grammatical errors in output information?

4.2. Find an algorithm that does challenging computations and it's the most suitable against the selected checklist.

- My code is a simple banking system that performs 4 basic tasks.
- Deposit, withdraw, balance checking, and exit option from the system.

4.3. Create 2 versions of algorithms, one is without applying the checklist and another one is which takes care of the checklist.

4.3.1. Code without applying the checklist.

```
import java.util.Scanner;

public class ErrorCheck{
 public static void main(String args[]){
    Scanner input=new Scanner(System.in);


    double bal=0;
    boolean ex=false;


    System.out.println("Welcome to Banking System");


    while(!ex){
        System.out.println("\nChoose an option:");
        System.out.println("1. Deposit");
        System.out.println("2. Withdraw");
        System.out.println("3. Check Balance");
        System.out.println("4. Exit");


        System.out.print("Enter your choice: ");
        int ch = input.nextInt();


        switch (ch) {
          case 1:
            System.out.print("Enter the amount to deposit: ");
            double depositAmount = input.nextDouble();
            bal += depositAmount;
```

```
            System.out.println("Deposit successful!");
            break;
        case 2:
            System.out.print("Enter the amount to withdraw: ");
            double withdrawAmount = input.nextDouble();
            if (withdrawAmount > bal) {
                System.out.println("Insufficient funds!");
            } else {
                bal -= withdrawAmount;
                System.out.println("Withdrawal successful!");
            }
            break;
        case 3:
            System.out.println("Your balance: Rs" + bal);
            break;
        case 4:
            ex = true;
            System.out.println("Thank you for using the  Banking System!");
            break;
        default:
            System.out.println("Invalid choice! Please choose a valid option.");
      }
    }
  }
}
```

4.3.2. Code with applying the checklist.

```
import java.util.Scanner;


public class ErrorCheck {
   public static void main(String[] args) {
      Scanner input = new Scanner(System.in);


      double bal = 0;
      boolean ex = false;


      System.out.println("Welcome to Banking System");


      while (!ex) {
         System.out.println("\nChoose an option:");
         System.out.println("1. Deposit");
         System.out.println("2. Withdraw");
         System.out.println("3. Check Balance");
         System.out.println("4. Exit");


         try {
            System.out.print("Enter your choice: ");
            int ch = input.nextInt();


            switch (ch) {
               case 1:
                  System.out.print("Enter the amount to deposit: ");
                  try{
                  double depositAmount = input.nextDouble();
                  if(depositAmount>0){
```

```
    bal += depositAmount;
    System.out.println("Deposit successful!");}
    else
    System.out.println("Invalid amount for deposit. ");
    }catch(Exception e){System.out.println(e);}
    break;
  case 2:
    try{
    System.out.print("Enter the amount to withdraw: ");
    double withdrawAmount = input.nextDouble();
    if(withdrawAmount>0){
    if (withdrawAmount > bal) {
      System.out.println("Insufficient funds!");
    } else {
      bal -= withdrawAmount;
      System.out.println("Withdrawal successful!");
    }}
    else{
      System.out.println("Invalid Amount");
    }
    }catch(Exception e){
      System.out.println("Invalid input!");
      input.next();
    }
    break;
  case 3:
    System.out.println("Your balance: Rs" + bal);
    break;
  case 4:
```

```
                ex = true;
                System.out.println("Thank you for using the Banking System!");
                break;
            default:
                System.out.println("Invalid choice! Please choose a valid option.");
          }
        } catch (Exception e) {
          System.out.println("Invalid menu! Please enter a valid menu.");
          input.next();
        }
      }
  }
}
```

4.4. Test Cases

Test ID	Description	Input Data	Expected Outcome	Actual Outcome	Status
TC_01	To deposit amount in account	Menu choice:1 Amount=3000	Balance should increase by 3000, "Deposit successful!" message should be displayed		
TC_02	To withdraw amount from account	Menu choice:2 Amount=2000	Balance should decrease by 2000, "Withdrawal successful!" message should be displayed		
TC_03	To check balance from account	Menu choice:3	Current balance should be displayed		
TC_04	To exit from the system	Menu choice:4	Program should terminate and displayed “Thank you for using the Banking system”		
TC_05	To deposit nonnumeric value in account	Menu: 1 Amount: abs	"Invalid input! Please enter a valid integer." message should be displayed		
TC_06	To input nonnumeric menu	Menu: e	“Invalid menu! Please enter a valid menu.”		

			Message should be displayed		
TC_07	To input menu value greater than 4	Menu: 5	“Invalid choice! Please enter a valid option.” Message should be displayed		
TC_08	To deposit negative amount in account	Menu: 1 Amount=-900	“Invalid amount for deposit” Message should be displayed		
TC_09	To withdraw amount greater than current balance of user	Menu: 2 Amount: 80000	"Insufficient funds!" message should be displayed		
TC_10	To withdraw non-numeric value	Menu: 2 Amount: w	“Invalid amount” message should be displayed		
TC_11	To withdraw negative amount	Menu: 2 Amount: -900	“Invalid amount” message should be displayed		