COMPUTER APPLICATIONS PROJECT

TERM-2

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IX-B
ROLL NO.-20

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Question 1:

Write a menu driven program in Java to display the first ten terms of the following series:

Series 1- 1, 4, 9, 16……

Series 2- 1.5, 3.0, 4.5, 6.0……

Answer:

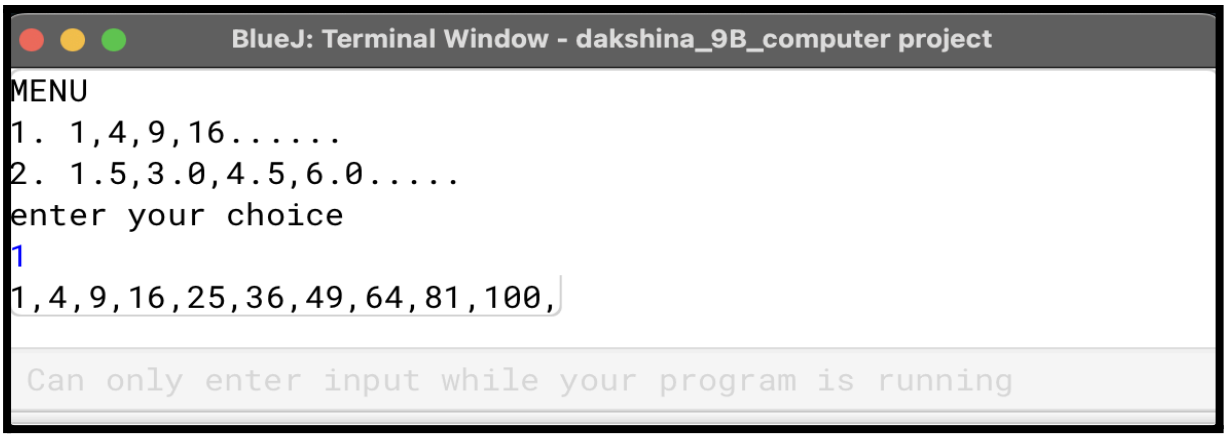
```
import java.util.Scanner;
public class program1
{
   public static void main(String [] args)
   {
      Scanner in=new Scanner(System.in); // Create a Scanner object to read user input
      System.out.println("MENU");
      System.out.println("1. 1,4,9,16.....");
      System.out.println("2. 1.5,3.0,4.5,6.0.....");
      System.out.println("enter your choice"); // Prompt the user to enter their choice
      int ch=in.nextInt();
       int n;
      double num;
      switch (ch)
      {
         case 1:
            for (n=1;n<=10;n++) // Loop to calculate and print squares of numbers from 1 to 10
            {
               System.out.print((int)Math.pow(n,2)+","); // Calculate square of n and print it
            }
           break;
         case 2:
            for (num=1.5;num<=15;num+=1.5) // Loop to calculate and print numbers in the series
            {
```

```
                System.out.print(num+","); // Print the current number in the series
            }
            break;
        default:
            System.out.println("invalid input");
    }
  }
}
```

Variable description table:

Variable name	Data type	Description
ch	char	For storing the choice entered by user
n	int	Used as loop counter in first series
num	double	Used as loop counter in second series

Output:



Question 2:

Write a program to enter any 10 numbers and check whether they are divisible by 5 or not. If divisible then perform the following tasks: a) Display all the numbers ending with the digit 5. b) Count those numbers ending with 0 (zero).

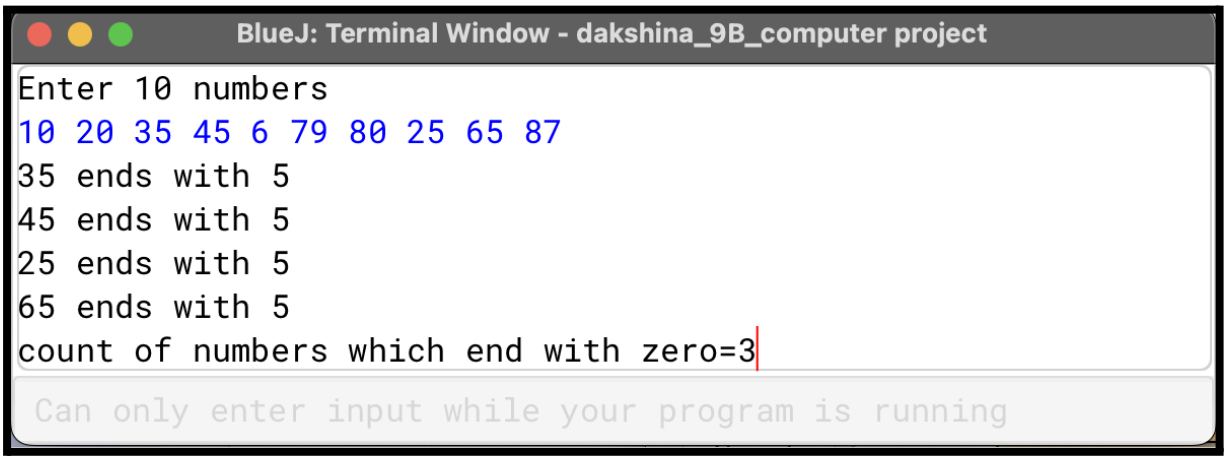
Answer:

```
import java.util.Scanner;
public class program2
{
   public static void main(String [] args)
   {
      Scanner in=new Scanner(System.in);
      int n, count=0, i;
      System.out.println("Enter 10 numbers"); // Prompt the user to enter 10 numbers
      for (i=1; i<=10; i++) // Loop to read 10 numbers
      {
         n=in.nextInt(); // Read each number from the user
         if (n%5==0) // Check if the number is divisible by 5
         {
            if (n%10==5) // Check if the number ends with 5
            {
               System.out.println(n+" ends with 5"); // Print if the number ends with 5
            }
            if (n%10==0) // Check if the number ends with 0
            {
               count++; // Increment the count of numbers ending with 0
            }
         }
      }
      System.out.println("count of numbers which end with zero="+count);
   }
}
```

Variable description table:

Variable name	Data type	Description
n	int	Stores each number entered by user in the loop
count	int	Counts the numbers which are divisible by 10
i	int	Loop counter variable which ensures that user enters exact 10 numbers

Output:



Question 3:

Write a program to input a number and check whether it is 'Magic Number' or not. Display the message accordingly. A number is said to be a magic number if the eventual sum of digits of the number is one.

Answer:

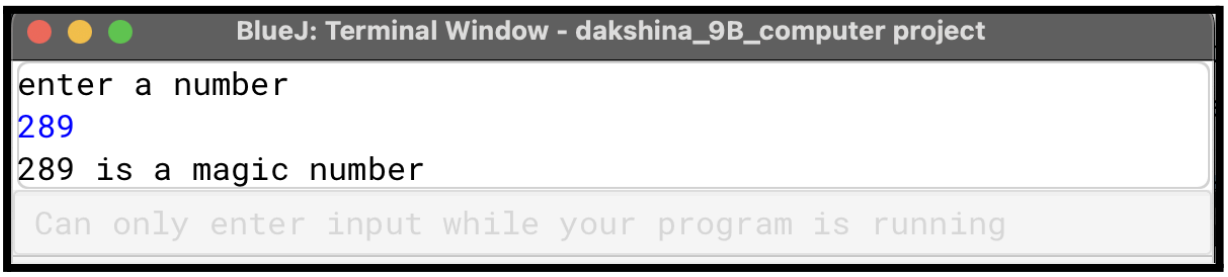
```
import java.util.Scanner;
public class program3
{
public static void main(String [] args)
{
Scanner in=new Scanner(System.in); // Create a Scanner object for input
int num, n, d, sum=0, dsum, sumofdigit=0; // Declare variables
System.out.println("enter a number"); // Prompt the user
num=in.nextInt();
n=num;
while (n>0) // Calculate the sum of digits
{
d=n%10; // Get the last digit
sum+=d; // Add it to the sum
n=n/10; // Remove the last digit
}
while (sum>0) // Reduce the sum to a single digit
{
dsum=sum%10; // Get the last digit of the sum
sumofdigit+=dsum; // Add it to the final sum
sum=sum/10; // Remove the last digit of the sum
}



if (sumofdigit==1 || sumofdigit==10) // Check if it’s a magic number
{
System.out.println(num+" is a magic number");
```

```
}
else
{
System.out.println(num+" is not a magic number");
}
}
}
```

Variable description table:

Variable name	Data type	Description
n	int	Temporary variable used for processing number
num	int	Stores number entered by user
d	int	Stores last digit on n during calculation of sum of digits
sum	int	Stores sum of digits of number
dsum	int	Stores the last digit of the sum during the reduction of the sum to a single digit
sumofdigit	int	Stores the final sum of digits, used to determine if the number is a magic number (1 or 10).

Output:



Question 4:

Write a Menu Driven program to accept a number from the user and check whether it is a Prime number or an Automorphic number.

a) Prime number – A number is said to be Prime if it is only divisible by 1 and itself.

b) Automorphic number – An Automorphic number is the number which is contained in the last digit(s) of its square.

Answer:

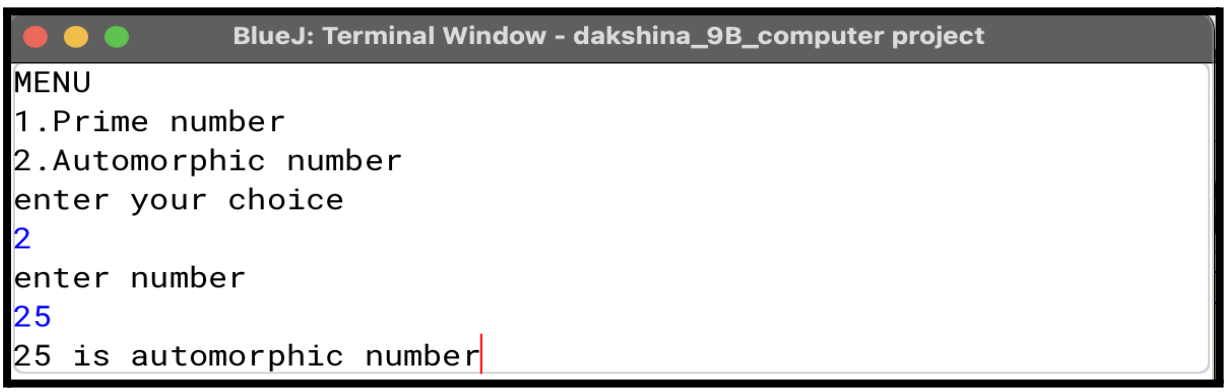
```
import java.util.Scanner;
public class program4
{
   public static void main(String [] args)
   {
      Scanner in=new Scanner(System.in);
      System.out.println("MENU");
      System.out.println("1.Prime number"); // Display option for prime number check
      System.out.println("2.Automorphic number"); // Display option for automorphic
number check
      System.out.println("enter your choice"); // Prompt user to enter their choice
      int ch=in.nextInt(); // Read user choice
      int n,i,f=0,square,num,d,ld; // Declare variables for processing numbers
      switch (ch)
      {
         case 1:
            System.out.println("enter number");
            n=in.nextInt();
            for (i=1;i<=n;i++) // Loop to check divisors of n
            {
               if (n%i==0) // If n is divisible by i, increment f
               {
                  f++;
               }
            }
            if (f==2) // If f is 2, it's a prime number
```

```
            {
                System.out.println(n+" is prime number");
            }
            else
            {
                System.out.println(n+" is not a prime number");
            }
            break;
        case 2:
            System.out.println("enter number");
            n=in.nextInt();
            num=n;
            square=num*num; // Calculate the square of the number
            d=0;
            while (num>0) // Count the number of digits in the original number
            {
                d++;
                num/=10;
            }
            ld=(int)(square%Math.pow(10,d)); // Extract the last d digits from the
square
            if (ld==n) // Check if the last digits of the square match the number
                System.out.println(n+" is automorphic number");
            else
                System.out.println(n+" is not an automorphic number");
            break;
        default:
            System.out.println("invalid input"); // Handle invalid input
      }
   }
}
```

Variable description table:

Variable name	Data type	Description
ch	int	Stores choice of user
n	int	Stores number entered by user
i	int	loop counter used to check divisors of n for prime number check.
f	int	Used to count the number of divisors of number, which helps determine if number is prime.
square	int	Stores the square of the number
num	int	Temporary variable to hold the original value of number for digit counting and comparison.
d	int	Stores the number of digits in number for extracting the last digits of the square.
ld	int	Stores last digits of square of number

Output:



Question 5:

Write a program to input a number and check and print whether it is a Pronic number or not.

Answer:

```
import java.util.Scanner;
public class program5
{
   public static void main(String [] args)
   {
      Scanner in=new Scanner(System.in);
      System.out.println("enter number"); // Prompt the user to enter a number
      int num=in.nextInt(); // Read the number entered by the user
      int i, f, prod=1, diff=1, numispronic=0; // Declare variables for calculations
      for (i=1;i<=num;i++) // Loop to check if the number is pronic
      {
         if ( (i+1)*i==num) // Check if the product of i and (i+1) equals the number
         {
            numispronic=1; // Set numispronic to 1 if it is a pronic number
         }
      }
      if (numispronic==1) // If numispronic is 1, it's a pronic number
      {
         System.out.println(num+" is a pronic number");
      }
      else
      {
         System.out.println(num+" is not a pronic number");
      }
   }
}
```

Variable description table:

Variable name	Data type	Description
num	int	Stores number
i	int	Loop counter to check pronic condition
numispronic	int	Flag variable to check if number is pronic

Output:

Question 6:

Write a program to input a number and print whether the number is Special number or not.

Answer:

```
import java.util.Scanner;
public class program6
{
   public static void main(String [] args)
   {
      Scanner in=new Scanner(System.in); // Create Scanner object for input
      System.out.println("enter number"); // Prompt the user to enter a number
      int num=in.nextInt(); // Read the number entered by the user
      int d, prod=1, sum=0, i, n; // Declare variables for calculations
      n=num;
      while (n>0) // Loop through the digits of the number
      {
         d=n%10; // Get the last digit of the number
         n=n/10; // Remove the last digit from the number
         prod=1;
         for (i=1;i<=d;i++) // Calculate the factorial of the digit
         {
            prod*=i; // Multiply to get the factorial
         }
         sum+=prod; // Add the factorial to the sum
      }
      if (sum==num) // Check if the sum of factorials equals the original number
      {
         System.out.println(num+" is a special number");
      }
      else
      {
         System.out.println(num+" is not a special number");
      }
```

```
 }
}
```

Variable description table:

Variable name	Data type	Description
num	int	Stores number
d	int	Stores current digit of number during loop
prod	int	Stores factorial of digit
sum	int	Stores sum of factorials of all digits
i	int	Loop counter to calculate factorial of digit
n	int	Temporary variable of num

Output:

Question 7:

Write a program to find the sum of the following series using nested loop:
x^2/2! + x^3/3! + x^4/4!+ .....+ x^n/n!

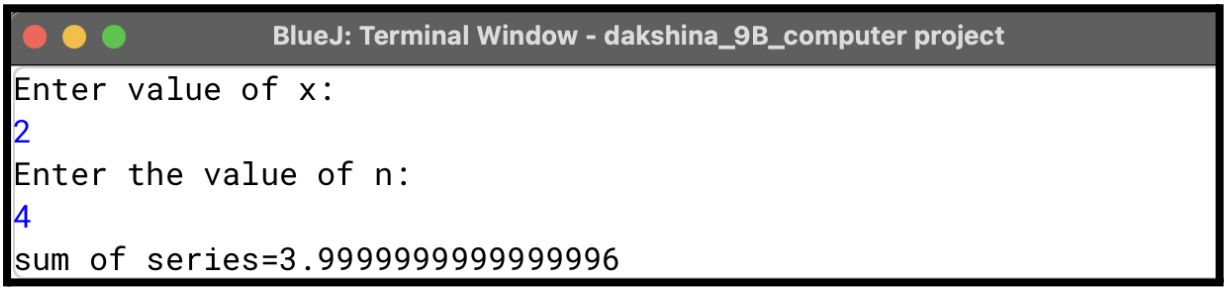
Answer:

```
import java.util.Scanner;
public class program7 {
    public static void main(String[] args) {
        Scanner in = new Scanner(System.in);

        // Input base x
        System.out.println("Enter value of x:");
        int x = in.nextInt();

        // Input upper limit n
        System.out.println("Enter the value of n:");
        int n = in.nextInt();

        double prod = 1, numerator, sum = 0.0;

        // Calculate series sum
        for (int i = 2; i <= n; i++) {
            numerator = Math.pow(x, i); // Calculate x^i
            prod = 1;
            for (int j = i; j >= 1; j--) {
                prod *= j; // Calculate i!
            }
            sum += (numerator / prod); // Add term to sum
        }

        // Output result
        System.out.println("Sum of series = " + sum);
    }
}
```

Variable description table:

Variable name	Data type	Description
x	int	Stores value of x
n	int	Stores value of n
prod	double	Stores factorial of current term
numerator	double	Stores value of numerator
sum	double	Accumulates the sum of series
i	int	Loop variable
j	int	Inner loop variable to calculate factorial

Output:



Question 8:

Write a program to print the following pattern using nested loop:

$

$ @

$ @ @ $

$ @ @ @ $

Answer:

```
public class program8
{
   public static void main(String[] args)
   {
      int i,j;
      for (i=1; i<=5;i++) // Outer loop to control the number of rows
      {
        for (j=1;j<=i;j++) // Inner loop to control the number of columns in each row
        {
          if (j==1 || j==i) // Check if it's the first or last column in the row
          {
             if (j!=2) // Special condition for the second column
             {
                System.out.print("$ ");
             }
             else
             {
                System.out.print("@ "); // Print "@" at the second column
             }
          }
          else
          {
             System.out.print("@ "); // Print "@" for other positions
          }
        }
        System.out.println(); // Move to the next line after printing one row
```

```
    }
  }
}
```

Variable description table:

Variable name	Data type	Description
i	int	Loop counter for rows
j	int	Loop counter for columns

Output:

Question 9:

Write a program to display the following series using nested loop:

1 11 111 …… 1111111111

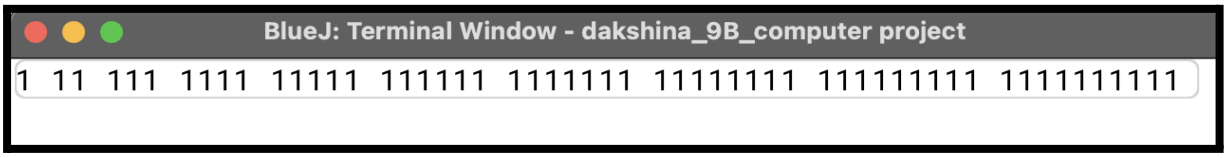
Answer:

```
public class program9
{
   public static void main(String[]args)
   {
      int i,j;
      for(i=1;i<=10;i++) // Outer loop controls the number of rows
      {
         for(j=1;j<=i;j++) // Inner loop controls the number of "1"s in each row
         {
            System.out.print("1"); // Print "1" for each column in the current row
         }
         System.out.print(" "); // Print space after each row
      }
   }
}
```

Variable description table:

Variable name	Data type	Description
i	int	Loop counter for rows
j	Int	Loop counter for columns

Output:



Question10:

Write a program in Java to display the following pattern using nested loop:

1 * * * *
* 2 * * *
* *3 * *
* * * 4 *
* * * * 5

Answer:

```
public class program10
{
   public static void main(String[]args)
   {
      int i,j;
      for(i=1;i<=5;i++) // Outer loop controls the number of rows
      {
         for(j=1;j<=5;j++) // Inner loop controls the number of columns in each row
         {
            if(j==i){ // Check if the column index equals the row index
               System.out.print(i);
            }
            else
            {
               System.out.print("*"); // Print "*" for all other positions
            }
         }
         System.out.println(); // Move to the next line after each row is printed
      }
   }
}
```

Variable description table:

Variable name	Data type	Description
i	int	Loop counter for controlling number of rows
j	int	Loop counter for controlling number of columns in each row

Output: