DATA STRUCTURES & ALGORITHM

Marasigan, Vem Aiensi A.
1-BSCS-.2

Ma'am Mary Jane Lima
Feb. 10, 2022

INTRODUCTION A

Source Code:

```
package introduction;
import java.util.Scanner;
public class BSCS2_Marasigan_IntrodutionA
{
  public static void main(String[] args)
  {
    Scanner in = new Scanner(System.in);

    int input, choice = 0;
    char d='N';
    do
    {
      //user input here
      System.out.print("Input Integer Value:\t");
      input = in.nextInt();
        do
        {
          //options here
          System.out.print("\nWhat do you want to do?\n1.\tSum of digits\n2.\tReverse the number"
              + "\n3.\tDisplay all the prime number from 2 to n (n is the user's input).\n\t"
              + "  Apply the algorithm of Sieve of Eratosthenese\n"
              + "4.\tPalindrome Checking\n5.\tOdd or even number"
              + "\n6.\tExit\n\n Enter option [1..6]:\t");
          choice = in.nextInt();

          //make methods for clarity
          switch (choice)
          {
            case 1:  sumOfDigit(input);                    break;
            case 2:    System.out.println(reverse(input));  break;
            case 3:  seiveOfErathosthenese(input);         break;
            case 4:  System.out.println(palindrome(input)); break;
            case 5:  System.out.println(oddOrEven(input));  break;
            case 6:      d = 'N';                          break;
          }

          if (choice < 6)
          {
            System.out.print("\nWant to try other options? [Y/N]:\t");
            String decide = in.next().toUpperCase();
            d = decide.charAt(0);
          }

        }while (d == 'Y');
```

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```
      if (choice < 6)
      {
        System.out.print("Want to try other Integer input? [Y/N]:\t");
        String decide = in.next().toUpperCase();
        d = decide.charAt(0);
        System.out.println();//just a space
      }
    }while (d == 'Y');
    end();
    in.close();
  }

            //methods here

  //                    Tools Here (-.-;)
  //digit analyzer
  static int[] getDigits(int a)
  {
    String numbers = Integer.toString(a);
    long limit = numbers.chars().count();
    int l = (int)limit;
    int storage[] = new int [l];
    for (int set = 0; set < l; set++)
    {
      storage[set] = a % 10;
      a = a /10;
    }
    return storage;
  }
  //get sum of array element (for integer elements only)
  static int arraySum(int []a)
  {
    int w = 0;
    for (int d = 0; d<a.length; d++)
    {
      w += a[d];
    }
    return w;
  }

  //                    User choices here (~.~!)
  //choice 1
  static void sumOfDigit(int a)
  {
    System.out.print("The digits are:");
    int[] set = getDigits(a);
```

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```
    int sum = 0;
    for (int digits = set.length - 1; digits > -1; digits-- )
    {
      System.out.print(" " + set[digits]);
      sum += set[digits];
      if (digits != 0)
      {
        System.out.print(" +");
      }
    }
    System.out.println("\nThe sum of the digits is: " + sum);
  }

  //choice 2
  static String reverse(int a)
  {
    int [] set = getDigits(a);
    String show = "";
    for (int digits = 0; digits <set.length; digits++)
    {
      show += set[digits];
    }
    return show;
  }

  //choice 3 (Oh globb!! I hate you so much!!!)
  static void seiveOfErathosthenese(int a)
  {
    int limit = a;              //a is integer input
    int deduct = limit-1;
    int array[] = new int [limit];
    int arrayBackUp[] = new int [limit];
    int first=1, second=0; //contains the sum of array[] and arrayBackup[] for simple comparison
    for (int s = 0; s < limit; s++)  //gives the array's elements from 1...a
      {
        array[s] = limit - (deduct);
        deduct--;
      }
    for (int s = 1; s<limit; s++ ) //prints 2..a in the first row
      {
        System.out.print(array[s]+"\t");
      }
    System.out.println();//moves the cursor next line for upcoming array prints
    int remainder;
    for (int n = 1; first != second ; n++)
    {
      if (array[n] !=0)
```

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```
        {
          for (int s = 0; s < limit; s++)
          {//this loop is placed here so that if array[n] = 0, it will skip too and won't create backup
            arrayBackUp[s] = array[s];
          }//creates a backup of the array[] bago dumaan ung array[] sa paguupdate of elements
          second = arraySum(arrayBackUp); //separate program that adds the value of array elements

          for (int s = array[n]; s<limit; s++)
          {
            remainder = array[s] % array[n]; //filters out the numbers that has a factor of whatever the value
            if (remainder == 0)             // of array[n] is.
            {// arrays[s] whatever the number it is will be converted to zero when it has a factor of array[n]
              array[s] = 0;
            }//this is the array updater I'm talking about in no. 142
          }

          first = arraySum(array);
          if (first == second) //this only prints a space if the first and second is already similar
          {
            System.out.println();
          }
          for (int s = 1; s<limit; s++ )
          {
            if (array[s] !=0)
            {//this skips the element that is zero
              System.out.print(array[s]+"\t");
            }
          }
          System.out.println();  //This only moves the cursor to next line for upcoming array prints
        }
      }
      System.out.println("Above are the prime numbers inside " + limit);
    }

    //choice 4
    static String palindrome(int a)
    {
      String answer = "";
      String comp = reverse(a);
      int b = Integer.parseInt(comp);
      if (b == a)
      {
        answer = comp + " is Palindrome";
      }
      else
      {
        answer = comp + " is not Palindrome";
```

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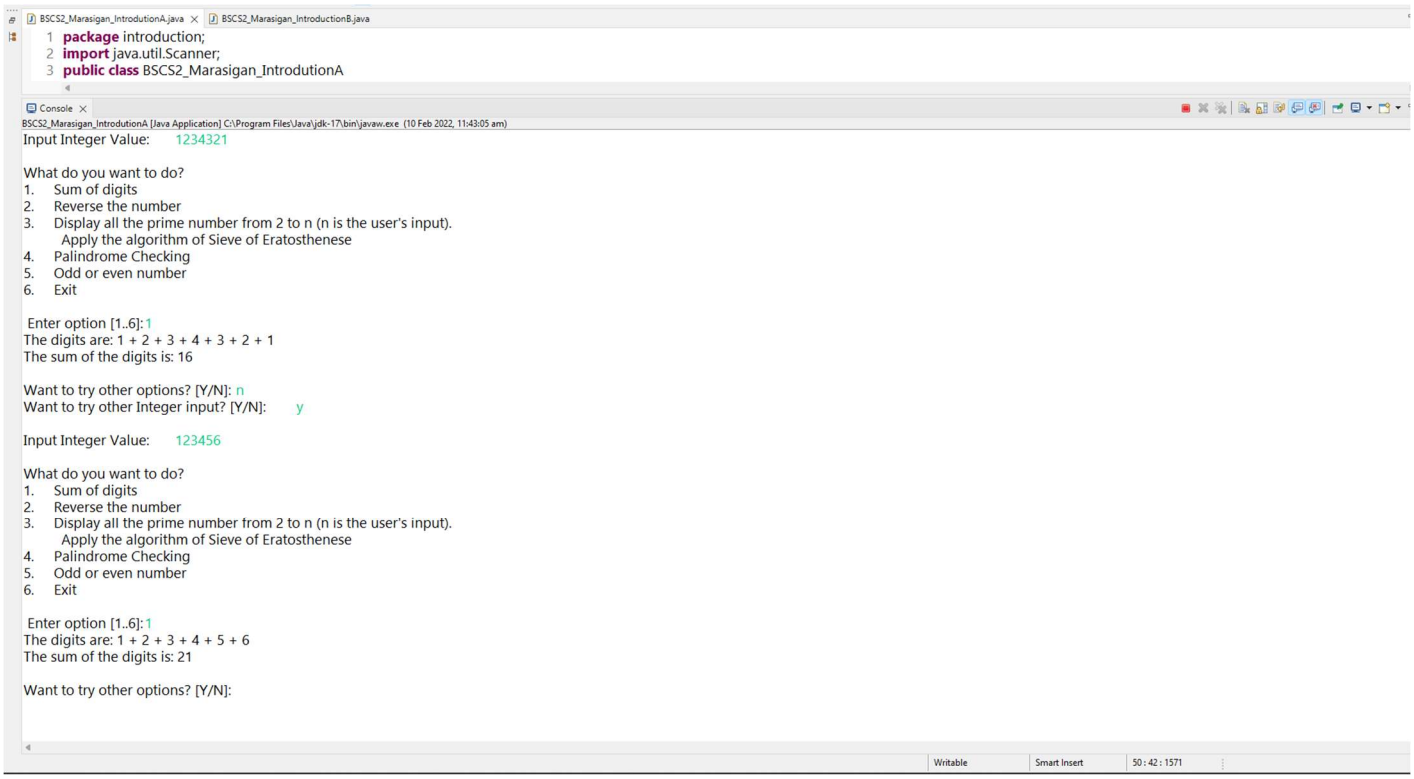
```
    }
    return answer;
  }

  //choice 5
  static String oddOrEven(int a)
  {
    String answer = "";
    double result = (a % 2);
    if (result == 0)
      answer = a + " is an Even number."; //sorry I forgot to include a space >.<
    else
      answer = a + " is an Odd number.";
    return answer;
  }

  //choice 6
  static void end()
  {
    System.out.println("\n\t\tThank You po for Using my Program\n"
        + "\t\t\t\t-Vem Aiensi ^_^");
  }
}
```

Output:



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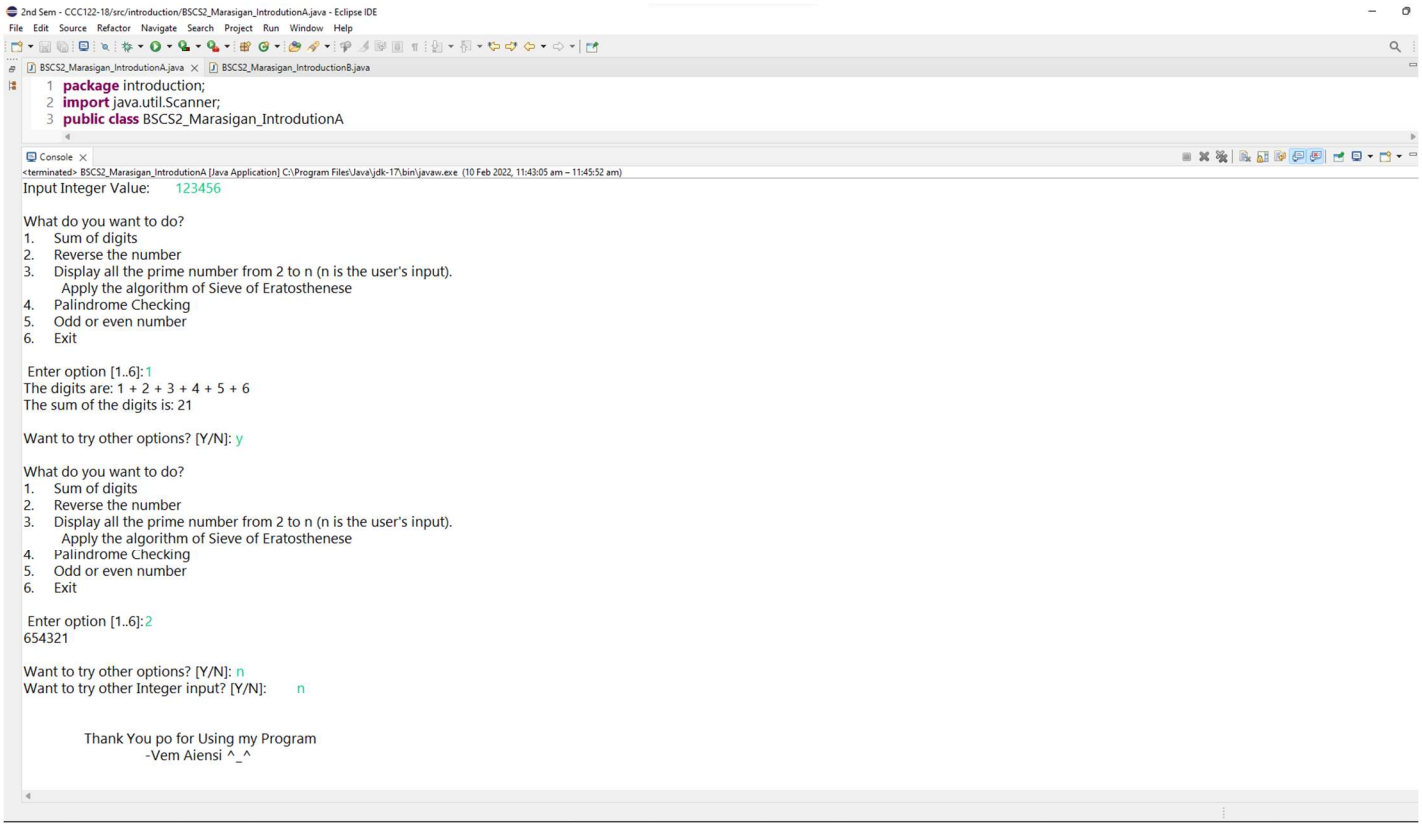

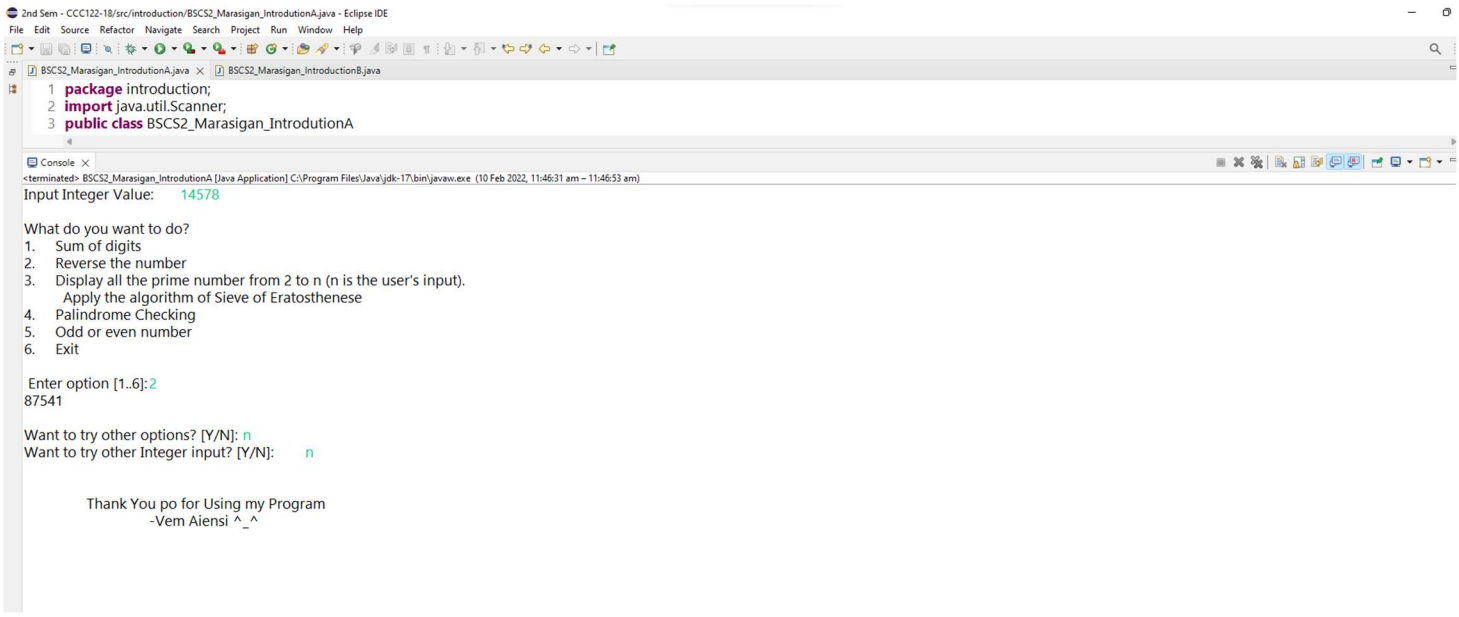

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```
2nd Sem - CCC122-18/src/introduction/BSCS2_Marasigan_IntrodutionA.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
BSCS2_Marasigan_IntrodutionA.java   BSCS2_Marasigan_IntrodutionB.java
package introduction;
import java.util.Scanner;
public class BSCS2_Marasigan_IntrodutionA
{
```

```
Console
BSCS2_Marasigan_IntrodutionA [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (10 Feb 2022, 11:47:14 am)
Input Integer Value:    15

What do you want to do?
1.  Sum of digits
2.  Reverse the number
3.  Display all the prime number from 2 to n (n is the user's input).
     Apply the algorithm of Sieve of Eratosthenese
4.  Palindrome Checking
5.  Odd or even number
6.  Exit

 Enter option [1..6]:    3
2   3   4   5   6   7   8   9   10  11  12  13  14  15
2   3   5   7   9   11  13  15
2   3   5   7   11  13

2   3   5   7   11  13
Above are the prime numbers inside 15

Want to try other options? [Y/N]:    n
Want to try other Integer input? [Y/N]:    y

Input Integer Value:    6

What do you want to do?
1.  Sum of digits
2.  Reverse the number
3.  Display all the prime number from 2 to n (n is the user's input).
     Apply the algorithm of Sieve of Eratosthenese
4.  Palindrome Checking
5.  Odd or even number
6.  Exit

 Enter option [1..6]:    3
2   3   4   5   6
2   3   5

2   3   5
Above are the prime numbers inside 6

Want to try other options? [Y/N]:
```

```
Input Integer Value:    100

What do you want to do?
1.  Sum of digits
2.  Reverse the number
3.  Display all the prime number from 2 to n (n is the user's input).
     Apply the algorithm of Sieve of Eratosthenese
4.  Palindrome Checking
5.  Odd or even number
6.  Exit

 Enter option [1..6]:    3
2   3   4   5   6   7   8   9   10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31  32  33  34  35  36  37  38  39  40  41  42  43  44  45  46  47  48  49  50  51  52  53  54  55  56  57  58  5
2   3   5   7   9   11  13  15  17  19  21  23  25  27  29  31  33  35  37  39  41  43  45  47  49  51  53  55  57  59  61  63  65  67  69  71  73  75  77  79  81  83  85  87  89  91  93  95  97  99
2   3   5   7   11  13  17  19  23  25  29  31  35  37  41  43  47  49  53  55  59  61  65  67  71  73  77  79  83  85  89  91  95  97
2   3   5   7   11  13  17  19  23  29  31  37  41  43  47  49  53  59  61  67  71  73  77  79  83  89  91  97
2   3   5   7   11  13  17  19  23  29  31  37  41  43  47  53  59  61  67  71  73  79  83  89  97

2   3   5   7   11  13  17  19  23  29  31  37  41  43  47  53  59  61  67  71  73  79  83  89  97
Above are the prime numbers inside 100

Want to try other options? [Y/N]:    n
Want to try other Integer input? [Y/N]:    y
```

```
Input Integer Value:    1000

What do you want to do?
1.  Sum of digits
2.  Reverse the number
3.  Display all the prime number from 2 to n (n is the user's input).
     Apply the algorithm of Sieve of Eratosthenese
4.  Palindrome Checking
5.  Odd or even number
6.  Exit

 Enter option [1..6]:    3
2   3   4   5   6   7   8   9   10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31  32  33  34  35  36  37  38  39  40  41  42  43  44  45  46  47  48  49  50  51  52  53  54  55  56  57  58  59
2   3   5   7   9   11  13  15  17  19  21  23  25  27  29  31  33  35  37  39  41  43  45  47  49  51  53  55  57  59  61  63  65  67  69  71  73  75  77  79  81  83  85  87  89  91  93  95  97  99  101 103 105 107 109 111 113 115
2   3   5   7   11  13  17  19  23  25  29  31  35  37  41  43  47  49  53  55  59  61  65  67  71  73  77  79  83  85  89  91  95  97  101 103 107 109 113 115 119 121 125 127 131 133 137 139 143 145 149 151 155 157 161 163 167 169
2   3   5   7   11  13  17  19  23  29  31  37  41  43  47  49  53  59  61  67  71  73  77  79  83  89  91  97  101 103 107 109 113 119 121 127 131 133 137 139 143 149 151 157 161 163 167 169 173 179 181 187 191 193 197 199 203 209
2   3   5   7   11  13  17  19  23  29  31  37  41  43  47  53  59  61  67  71  73  79  83  89  97  101 103 107 109 113 121 127 131 137 139 143 149 151 157 163 167 169 173 179 181 187 191 193 197 199 209 211 221 223 227 229 233 239
2   3   5   7   11  13  17  19  23  29  31  37  41  43  47  53  59  61  67  71  73  79  83  89  97  101 103 107 109 113 127 131 137 139 149 151 157 163 167 169 173 179 181 191 193 197 199 211 221 223 227 229 233 239 241 247 251 257
2   3   5   7   11  13  17  19  23  29  31  37  41  43  47  53  59  61  67  71  73  79  83  89  97  101 103 107 109 113 127 131 137 139 149 151 157 163 167 173 179 181 191 193 197 199 211 223 227 229 233 239 241 251 257 263 269 271
2   3   5   7   11  13  17  19  23  29  31  37  41  43  47  53  59  61  67  71  73  79  83  89  97  101 103 107 109 113 127 131 137 139 149 151 157 163 167 173 179 181 191 193 197 199 211 223 227 229 233 239 241 251 257 263 269 271
2   3   5   7   11  13  17  19  23  29  31  37  41  43  47  53  59  61  67  71  73  79  83  89  97  101 103 107 109 113 127 131 137 139 149 151 157 163 167 173 179 181 191 193 197 199 211 223 227 229 233 239 241 251 257 263 269 271
2   3   5   7   11  13  17  19  23  29  31  37  41  43  47  53  59  61  67  71  73  79  83  89  97  101 103 107 109 113 127 131 137 139 149 151 157 163 167 173 179 181 191 193 197 199 211 223 227 229 233 239 241 251 257 263 269 271
2   3   5   7   11  13  17  19  23  29  31  37  41  43  47  53  59  61  67  71  73  79  83  89  97  101 103 107 109 113 127 131 137 139 149 151 157 163 167 173 179 181 191 193 197 199 211 223 227 229 233 239 241 251 257 263 269 271
2   3   5   7   11  13  17  19  23  29  31  37  41  43  47  53  59  61  67  71  73  79  83  89  97  101 103 107 109 113 127 131 137 139 149 151 157 163 167 173 179 181 191 193 197 199 211 223 227 229 233 239 241 251 257 263 269 271

2   3   5   7   11  13  17  19  23  29  31  37  41  43  47  53  59  61  67  71  73  79  83  89  97  101 103 107 109 113 127 131 137 139 149 151 157 163 167 173 179 181 191 193 197 199 211 223 227 229 233 239 241 251 257 263 269 271
Above are the prime numbers inside 1000

Want to try other options? [Y/N]:
```

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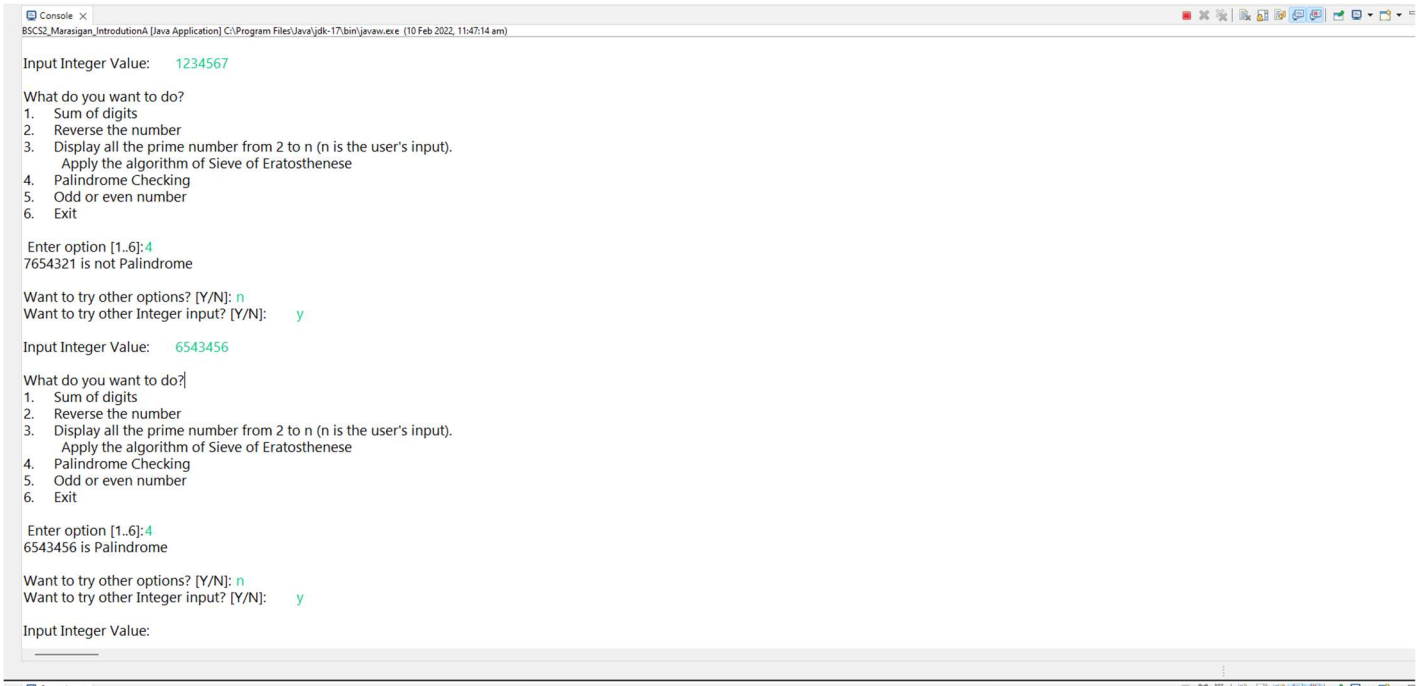

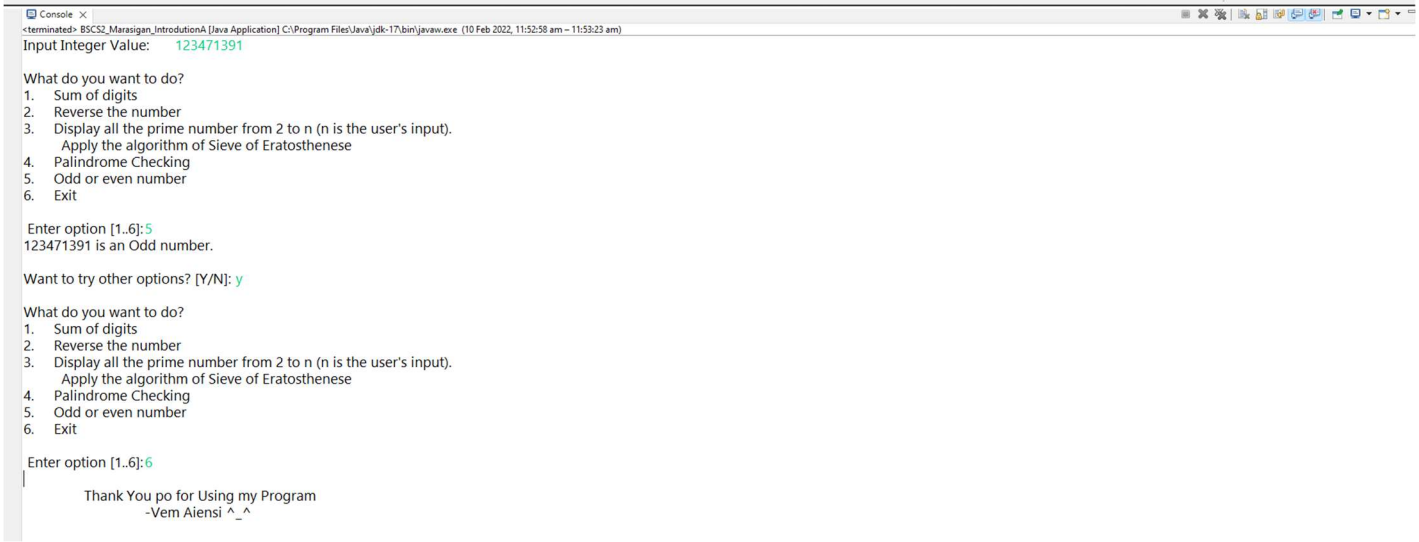

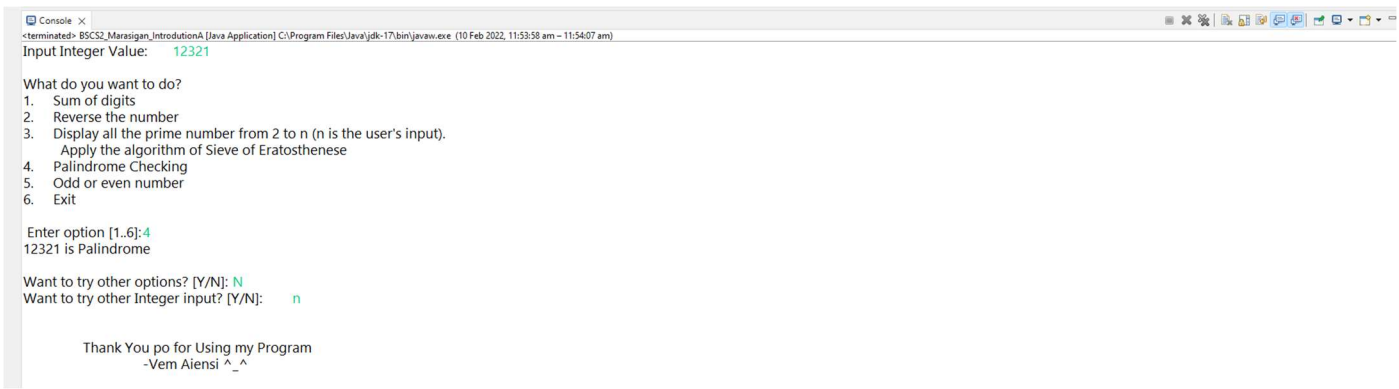

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