**THI THỰC HÀNH (PE - Practical Problemam)**

* Thời gian thi: Thứ 7 tuần 9 của kỳ
* Số lượng câu: 10 câu
* Thời gian làm và nộp bài: 85 phút

**NỘI DUNG ÔN TẬP**

1. **Number comparison / Simple math operation**

**Problem 1.1.**

Users are required to enter an integer variable 'a' using the keyboard (STDIN).

Please check the following conditions:

• If a is odd then print: “a is odd”

• Else print: “a is not odd”

Below is an Problemample of bow the program will run:Enter the values 1or 2 for ‘a’

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**Problem 1.2.**

The program allows the user to enter a real number from the keyboard. This real number is the score of a subject holding the test.

The program prints to the screen with the following cases:

- “Passed with the score: score”, if 5.0 <=score <=10.0

- “Failed m ith the score: score”, if 0.0 <= score < 5

Here is an Problemample of how the program will run:Enter values for the score; 7.5

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**Problem 1.3.**

Your program allows users to enter a side length of a square ‘x’ using the keyboard (STDIN}.

Please print out the perimeter of the square with 3 decimal places. Where, perimeter = 4 \* length

Below is an Problemample of how the program will run:

Enter the value 2.86 for ‘x’:

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**Problem 1.4.**

Users are required to enter a side length of a square: x using the keyboard (STDIN).

Please print out the area of the square with 2 decimal places.

Below is an Problemample of how the program will run:Enter the value 1.77 for ‘x’

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**Problem 1.5.**

Users are required to enter two integer variables a and b using the keyboard (STDIN). Please check the 'oilowing conditions:

•1' ai s greater titan or equal io b then print: a>=b

•1' a i sic Shan b then print: a<b s

Below is an Problemample ‘o’ how the program will run: Enter the value I 'or ‘a’ and the value 4 'or ‘b’

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**Problem 1.6.**

The program allows the user to enter three reals from the keyboard.

Print to the screen the average of three numbers with two decimal places.

Here is an Problemample:

Enter three numbers with the value: 5.5; 6; and 8.6.

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**Problem 1.7.**

The program allows the user to input two real numbers, ‘x’ and ‘y’, from the keyboard, with the value of ‘y’ non-zero.

Prior the result at the x/y calculation with three digits after the decimal point.

Here is an Problemample of how the program runs:

|  |  |
| --- | --- |
| Enter x= 3.5555; y=5.222  A black screen with white text  Description automatically generated | Enter x> 3.5555; y=5.222  A black screen with white text  Description automatically generated |

1. **Calculating product / sum / division / minus**

**Problem 2.1.**

Users are required to enter a non-negative integer variables n using the keyboard (STDIN). The system displays the sum o' the last three even numbers in range 'rom 0 to n.

Below is an Problemample o' how the program will run: Enter the value 6 'or ‘n'

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**Problem 2.2.**

Users are required to enter a non-negative integer variables n using the keyboard (STDIN).The system displays the sum of all even numbers that smaller or equal nBelow is an Problemample of how the program will run:Enter the value 5 for 'n':

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**Problem 2.3.**

Users are required to enter six integer numbers using the keyboard (STDIN).

The program needs to sum calculate of the even numbers among the entered values. The program then displays this number on screen.

Below is an Problemample of how the program will run:

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**Problem 2.4.**

The program allows the user to input an array of integers consisting of ‘n’ elements from the keyboard.

Print to the screen the sum of the values of the odd numbers.

Here is an Problemample of how the program will run:

Enter: n = 6, elements: 9, 7,12, 8, 6, 15

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**Problem 2.5.**

Users are required to enter six integer numbers using the keyboard (STDIN).

The program needs to sum calculate of the even rubbers among the entered values. The program then displays this number on screen.

Below is an example of how the program will run:

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**Problem 2.6.**

Your program allows users to enter an array of n integers, where n is entered by the user (n should be kept as a small value, in this case, n <= 10). Your program should then print the sum of squared of each even integer.

Hint: It is possible to use int\* array = (int\*)malloc(sizeof(int)\*n) to create 6a dynamic array

Below is an example:

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**Problem 2.7.**

Your program should allow users to enter an integer number 'n', then it should display the sum of the

first and the last digits forming 'n'.

Example:

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**Problem 2.8.**

Your program should allow users to enter an integer number ‘n’, then it should display the sum of all the digits forming ‘n’.Example:

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**Problem 2.9.**

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**Problem 2.10.**

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**Problem 2.11.**

Z number is a positive integer Chat sum of its digits is equal to multiply of its digits.

For example, 123, 132, 213, 231, 312 and 321 are Z numbers because 1 +2+3=1\*2\* 3.

But 52 is not a Z number because 5+2 = 7 and 5\*2= 10.

Input

Users are required to enter a positive integer N (0<=N<= 109) using the keyboard (STDIN),

Output

Please print out "Yes'\* even if N is a Z number. Otherwise, prints out “No\* even if N is not a

Z number.

Sample

Below is an example of how the program will run:Sample I

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**Problem 2.12.**

Your program allows users to enter array of n integers, where n is entered by the user (n should be kept as a small value, in this case, n<=10). Your program should then print the sum of squared of each odd integer.

Hint: It is possible to use Int\* array =(int \* malloc(sizeof(int)\*n) to create a dynamic array.

Below are some Problemamples:

|  |  |
| --- | --- |
| n=5  array =(1,3,5,2,3) | n=3  array =(1,2,3) |

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**Problem 2.13.**

The program allows the user to enter five integers from the keyboard (STDIN),The program prints the total value of numbers divisible by 3 and not by 5 on the screen.Below is an Problemample:

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**Problem 2.14.**

Your program allows the user to enter an integer array of ‘n’ elements

The system finds the index of the first pair with a given sum in the collection, A newline character ‘\n’ exists between any two printed indexes.

Beiow is an example when ‘n’ = 6; array = {6, 8, 4, -5, 7,9}; sum = 15

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1. **Sorting problems**

**Problem 3.1.**

Users are required to enter five integer numbers using the keyboard (STDIN).

The program needs to find the maximum even number among the entered values. The program then displays this number on screen.

Below is an Problemample of how the program will run:

**Problem 2.2.**

Your program allows the user to enter an integer array of ‘n’ elements from the keyboard.

The program swaps the places of the first largest and smallest even numbers with each other.

Below is an Problemample:

Enter n = 7; array = {5, 2, 8, 0, 9, 6, 20}

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**Problem 3.1.**

Your program allows users to enter 7 integer numbers into an array.

The system per'orms selection sorting o' the array in ascending order then prints the sorted array. There is a space character between any two adjacent numbers.

Below is an Problemample o' how the program will run:

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**Problem 3.1.**

Your program allows users to enter 4 float numbers.

The system displays the entered numbers in descending order. Each number has only two decimals places.

Below is an Problemample of bow the program will run:

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**Problem 3.1.**

Your program allows users to enter 5 float numbers.

The system displays the entered numbers in descending order.

Below is an example of how the program will run:

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**Problem 3.1.**

Your program allows users to enter 5 “integer” numbers.

The system sorts the entered numbers in ascending order. The system then displays only the even numbers to screen. There is a newline character between any two adjacent numbers.

Below is an Problemample of how the program will run:

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**Problem 3.1.**

Your program allows the user to enter an array of ‘n’ integer numbers, where ‘n’ is entered from the keyboard (STDIN)

Program to print the odd numbers sorted in ascending order There is a newline character "\n" between any two printed numbers.

Below is an Problemample when ‘n’ = 7; elements {5, -4, -5, 9, 15, 8, 10)

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**Problem 3.1.**

The program allows the user to input an Integer array of ‘n’ elements. With ‘n’ and the value of the elements entered from the keyboard.

The program prints to the screen the elements are arranged in ascending order In the order of odd numbers first, even numbers later.

An Problemample of how the program runs Isas follows:

Enter: n = 6; array = {4, 9, 8, 2, 7, 3}

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**Problem 3.1.**

**A screenshot of a computer program

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1. **Print shapes (e.g., triangle, square…) using special characters (e.g. “\*” or numbers)**

**Problem 4.1.**

Q4

Your program allows users to enter an integer number 'n'. The program prints out a hollow inverted pyramid star pattern of height 'n\*. Below is an Problemample of how the program will run:

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**Problem 3.1.**

Your program allows users to enter height ‘h’ of a pyramid (h < 20).The program prints out half of the pyramid filled with character ‘\*’.Below is an Problemample of how the program will run:

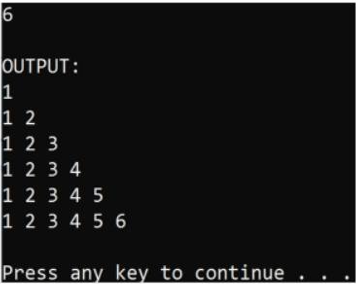
A black screen with white text

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**Problem 3.1.**

Users are required to enter an integer number to define 'rows\* of the half Pyramid pattern (row > 0}.

Program prints out the half Pyramid of number.Below is an Problemample of how the program will run.For Problemample, enter 6 for ‘row.’



The result does not contains the space after \*.

**Problem 4.1.**

Users are required to enter an integer number to define "rows" of the half Pyramid pattern (row > 0). Program prints out the half Pyramid of numbers.Below Is an Problemample of how the program will run.For Problemample, enter 6 for “rows":

A computer screen with white numbers

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**Problem 4.1.**

A screenshot of a computer program

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**Problem 4.1.**

Your program allows to print out a half diamond star (\*) pattern with Jnr columns entered by user (‘n’ is an integer number).

Below is an Problemample when user enter ‘n’ = 6

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**Problem 4.1.**

Your program allows users to enter an integer number n.

The system displays an inverted right triangle with the height = n.

Below is an example of how the program will run:

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**A screenshot of a computer program

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1. **Array problems**

**Problem 5.1.**

Your program allows users to enter array ‘o’ n integers, where n is entered by the user (N<20).

• 1' the array is symmetric, the program displays: 1

• Otherwise the program displays: 0 Below is some Problemamples:

A screenshot of a computer program

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**Problem 5.2.**

Your program allows the user to enter an integer array of ‘n’ elements.

The system finds the ind Problem of the first pair with a given sum in the collection, A newline character ‘\n’ Problemists between any two printed indProblemes.

Below is an Problemample when ‘n’ = 6; array = {6, 8, 4, -5, 7,9}; sum = 15

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**Problem 5.3.**

Your program allows users to enter array of 'n' integer, where 'n is entered by the user (n < 10).

The program prints the squared of each entered even number following the order that they were entered.

There is a newline character “\n” between any two printed numbers.Below is an Problemample when ‘n’= 5

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1. **String problems**

**Problem 6.1.**

Your program allows users to enter 4 characters.

HIE system displays the entered characters ’ollowing alphabetical order. There is a space character in BEUWEEN any UWO adjacent characters.

Below is an Problemample o’ how the program will run:

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**Problem 6.2.**

Your program allows users to enter a string with an odd number o' characters (5<n<20). THE program UIIEN DISPIAYS UHE MIDDIE 5 characters o' the string.

Below is an Problemample:

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**Problem 6.2.**

Your program should allow users to enter a decimal number from 48 to 90, then it should display the corresponding character in the ASCII table.

Problemample:

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**Problem 6.2.**

Your program should allow users to enter a character, then it should display the location of that character in the ASCII table and its octal format.

Example:

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**Problem 6.2.**

Your program allows users to enter a string: ‘s’ with maximum length of 100 characters. The system finds the number of words starting with letter 'h' and ending with letter 'g' in ‘s’. Finally, the system prints out that number.

Below is an Problemample:

s=healing hopping feeling going

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**Problem 6.2.**

Your program should allow users to enter a string ‘s’ with maximum 100 characters, then it should display the number of characters in the first three words of ‘s’. Words are separated from each other by a space character.

Problemamples:

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**Problem 6.2.**

Your program allows users to enter a string: ‘s’ with maximum length of 100 characters.

The system finds characters in the alphabet m the position with an odd indProblem to convert to uppercase characters.

Below is an Problemample with ‘s’ is “abcd4ae”:

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**Problem 6.2.**

The program allows the user to enter a string of characters from the keyboard, with a maximum length of 100,

Then, check the characters in the entered string. If the check character is a lowercase letter, it will be converted to an uppercase letter.

Print to the screen the character string after the conversion has been completed.Below is an Problemample: s = “prf192 - c Programming”

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**Problem 6.2.**

Your program allows the user to enter a string of characters from the keyboard. The program to toggle case of each character (a-z A-Z) in this string.

The program prints out result on the screen.Below is an Problemample of how the program will run:

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**Problem 6.2.**

Write a program that allows you to accept a sentence and then convert this sentence into capitalized format.

Input: Contains the sentence S which length is up to 200 characters.

Output: Please print out the capitalized format of sentence S.

Sample

Below is an example of how the program will run:A black screen with white text

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**Problem 6.2.**

Your program allows the user to enter a string ‘n’ with a maximum length of 100 characters.

The system converts the two first letters of each word to uppercase.

Print out the string 's' after the conversion.

Below are two Problemamples of how the program will run:

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**Problem 6.2.**

The program allows the user to enter a list of ‘n’ student names from the keyboard, each student name separated by a space.

Continue, enter a search character,

The system finds and prints the names of students whose letters start with the search character.

Below is an example of how to run the program:

Enter: n = 5, names = {"Dung", “du", “Duong", “Duc", “Toan"}, searchKey = ‘D’

**Problem 6.2.**

Your program allows users to enter 5 person names into an array ‘o’ strings. THE program per'orms sorting ‘o’ the array in ascending order then prints each element ‘o’ the array allowed by a space Character.

Below is an Problemample:

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**Problem 6.2.**

The program allows the user to enter a list of ‘n’ student names from the keyboard, each student name separated by a space.

Continue, enter a search character,

The system finds and prints the names of students whose letters start with the search character.

Below is an Problemample of how to run the program:

Enter: n = 5, names = {"Hoa", “Hoang”, “Binh", “hai", “Toan"}, search Key = ‘H’

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1. **More advanced array problems**

**Problem 7.1.**

Your program should allow users to find the even number that appears the most in the array of 7 integers.

When the even number that appears the most in the array, your program prints out that number.When there is no even number Problemisting in the array, your program prints to output: Pew!!!Below is the Problemample show how the program works:

A screenshot of a computer

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**Problem 7.1.**Your program should allow users to find the two-digit number(s) that appear(s) the most in the array of 7 integers. Then your program should print out the found two-digit numbers.

Below are some examples to show how the program works:

|  |  |  |
| --- | --- | --- |
| There is only one most appearing two-digit number | There is no two-digit number | There are more than one most appearing two-digit numbers |

A screen shot of a computer

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**Problem 7.1.**Your program allows the user to enter an integer array of ‘n’ elements from the keyboard.

The program prints the elements with unique values in ascending order, between the elements separated by a space.

Below is an Problemample:Enter n = 7; array = {8, 5, 8, 5, 9, 6, 9}

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**Problem 7.1.**Your program allows users to enter array of n integers, where n is entered by the user (n < 10).

The program removes all duplicated odd numbers (keeps only the first occurrence of the numbers).

Then, the program prints the resultant list of numbers (after removing the duplicated ones).

Between any two numbers, there is a newline character.

Below is an Problemample how the program works:

A screen shot of a computer

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**Problem 7.1.** Your program allows the user to enter an integer array of ‘n’ elements from the keyboard.

The program prints the elements with unique values in ascending order, between the elements

separated by a space.

Below is an example:Enter n = 7; array = {8, 5, 8, 5, 9, 6, 9}

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**Problem 7.1.**Your program should allow users to enter an array of ‘n’ characters where ‘n’ < 20, ‘n’ is entered by users.

It finds and displays the first two characters appearing the most (having the highest frequencies) among the entered characters.

The program outputs each character on a separate line. The order of output characters follows the order they were entered by users.

Below is the Problemample show how the program works:

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**Problem 7.1.**Your program allows users to enter an array of ’n' integer numbers, where the user enters ‘n’ (0<n<10). Then the user enters an integer number 'p' which is the position of an element to remove from the array (0<p<=n).

Below is an Problemample of how the program will run when entering the values 5 lor ‘n’; the values of the array include {6, 10, 0, 9, 7}; 3 for ‘p’

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**Problem 7.1.**Your program allows users to enter a long string 'o' and short string 'p'. The system replaces all occurrences of 'p' in 'o' by the inverse of 'p'.

Below is an Problemample:

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**Problem 7.1.**Yours program allows users enter a long string ‘o’ and a short string ‘p’. The system finds the occurrences of ‘p’ in ‘o’ and replaces them by the reversed of ‘p’. It then prints out the modified string ‘o’.

Below is an example:

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**Problem 7.1.**

Your program allows users to enter a string 's' with maximum length at 100 characters The system finds and remove all characters m a string Problemcept the alphabet characters (a-z, A-Z).

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**Problem 7.1.**Your program allows users to enter an integer array of ‘’n’ (n>0) elements entered from the keyboard. The program put even and odd elements in separate array, And then prints out two lines result on the screen

Here is an Problemample of how the program will run:

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**Problem 7.1.**The program allows the user to enter the values of the elements of the square matrix as integers with the same number of rows and columns and input from the keyboard.

Print the sum of the elements on the main diagonal of the matrix.

Below is art Problemample:

When 'rows' = 3; array ={ 10 8 4

-5 15 1

7 2 3}

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**Problem 7.1.**The program allows the user to enter the values of the elements of the square matrix as integers with

the same number of rows and columns and input from the keyboard.

Print the sum of the elements on the main diagonal of the matrix.

Below is art example:

When 'rows' = 3; array ={ 10 8 4

-5 15 1

7 2 3}

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**Problem 7.1.**Write a program to add 2 matrices A and B. Two matrices A and B have N rows and M columns.

Input:

The first line contains N and M (1 <=N, M<=100).

The next N lines are the first matrix An x mh (0 <=i<= N-1; 0 <=j <=M-1,

-109<=aij<=109).

The last N lines are the second matrix BNxM (0 <=i <=N-1; 0 <=j <=M-1;

-109 <=bij <=109).

Output: Please print out the additionaI result

Sample

Below is an example of how the program will run:

Sample 1

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1. **Numbering problems**

**Problem 8.1.**

Your program should allow users to enter an integer number 'n', then it should display the product of all

the digits forming ‘n’.

Problemample:

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**Problem 8.1.**

Your program allows the user to input an integer ‘n‘.

Print out: “n is a perfect number” or “n is not a perfect number”. A perfect number is a number equal to the sum of its divisor.

Below is an example:

|  |  |
| --- | --- |
| n=6  A black background with white text  Description automatically generated | n=10  A black background with white text  Description automatically generated |

**Problem 8.1.**Your program should allow users to enter an integer number: ‘a’. The program should check if ‘a’ is a power of 2 or not. If it is, the program prints the Problemponent ‘n’ that makes the number ‘a’ the power of 2; else, the program prints: “a is not a power of 2” where ‘a’ is the entered number from user.

Problemample:

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**Problem 8.1.**Your program should allow users to enter an integer ‘n’.

The program prints hProblemadecimal representation of ‘n’ if it is a prime number; else the program prints: “n is not a prime number” where ‘n’ is the number entered by the user.

Problemamples:

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**Problem 8.1.**Your program should allow users to enter an integer 'n'.

The program prints hProblemadecimal representation of 'n' if it is a prime number, else the program prints:”n is not a prime number” where ‘n’ is the number entered by the user.

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**Problem 8.1.**

The program allows the user to enter a positive integer ‘n’ from the keyboard.

The program checks and prints to the screen if ‘n’ is a leap year and vice versa. Knowing that a leap year is a year that obeys one of the following two principles.

- A leap year is a year that is divisible by 400:

- A leap year is a year that is divisible by 4 but snot divisible by 100

Here Is an Problemample of how the program will run:

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**Problem 8.1.**Your program should allow users to enter an integer number ‘n’, then it should display as follows.

If ‘n’ is prime number, displays: Not Prime

If ‘n’ is not prime number, displays: Prime

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