Assignment (1 to 5)

Assignment - 01

1. Given an array of elements. Find the arithmetic mean.

    Input: 5
    34 88 32 12 10
    Output: 35.00

2. Given an array of elements. Find the geometric mean.

    Input: 5
    15 12 13 19 10
    Output: 13.477

3. Given an array of elements, find harmonic mean of numbers

    Input: 5

    13.5 14.5 14.8 15.2 16.1

    Output: 14.770681

4. Given N number print Floyd's triangle up to N line

    Input: 4

    Output:

    1

    2 3

    4 5 6

    7 8 9 10

5. Print like the output using Floyd's triangle

    A

    AP

    APP

    APPL

    APPLI

    .

    .

.

APPLIED MATHEMATICS

6. Given an array of elements. Print them as ascending order using Bubble sort

Input: 5

9 3 1 2 4

Output: 1 2 3 4 9

7. Given an array of elements. Print them as descending order using Bubble sort

Input: 5

9 3 1 2 4

Output: 9 4 3 2 1

8. Given N number of character array. Print them as descending order using Bubble sort

Input:5

a b c d e

Output: e d c b a

9. Given N size of an array & a number S. if S is in array print “Found” otherwise “Not found” using binary search

Input: 5 ///size

8 9 1 2 3

3

Output: Found ///since 3 is in array

10. Given a string. Reverse the string and print using recursion

Input: Mathematics

Output: scitamehtaM

11. Given a string, Find the first characters of its each sub string.

Input: Dept. of Applied Mathematics.

Output: D o A M

12. Given a string, Print the sub string in each new line.

Input: Dept. of Applied Mathematics.

Output: Dept

Of

Applied

Mathematics

13. Given a string, print upper case to lower case or lower case to upper case of its character

Input: Dept. of Applied Mathematics.

Output: dEPT. OF aPPLIED mATHEMATICS .

14. Given N size of array. Print the prime numbers in this number.

Input: 6

1,2,3,4,5,6

Output: 2,3,5

15. Given a number N, find all prime numbers up to N (N included).

Input: 7

Output: 2,3,5,7

16. Given a number N positive or negative. print (“Yes”) if it’s prime otherwise print (“No”)

Input: -7

Output: No

Input: 7

Output: Yes

17. Given coefficients of a, b, c of quadric equation ax^2+bx+c=0. Print it’s root

Input: 2.3 4 5.6

Output: -0.87+1.30i , -0.87-1.30i

18. Given a number, print the Pascal's triangle as descending order.;

input: 5

output:

1 4 6 4 1

1 3 3 1

1 2 1

1 1

1

19. Given a number, print the Pascal's triangle as descending order. and print (*) other space

input: 5

output:

1 4 6 4 1

1 3 3 1 *

1 2 1 * *

1 1 * * *

1 * * * * *

20. Given two number, create Pascal's triangle according to first number, and print the Pascal's triangle line according to second number.

input: 5 3

output:

1 2 1 ///3rd line of Pascal's triangle

21. Given a number, create Pascal's triangle and print the total element of the triangle

input: 5

output: 15

22. Given N size of an array and a number. count the number that comes in array

Input: 10 5/// array size 10 & number 5

1 2 5 4 5 4 53 1 5 ///array element

output: 4 /// 5 comes 3rd time in array so count is 3

23. Given N size of an array, print the value of the array without duplicate value

Input: 10

1 1 2 3 2 4 5 9 12 12

Output: 1 2 3 4 5 9 12 /// without duplicate value

24. Given N size of an array & a number, print ("Yes") if the value is inside the array otherwise print("No")

Input: 5 4

1 5 8 19 20

Output: Yes /// as 4 is inside the array

Input: 5 2 4

1 5 8 19 20

Output: No

25. Given a number, print it's factorial using recursion

Input: 5

Output: 120

26. Given a number, print remainder with it's factorial using recursion

Input: 5

Output: 0 ///since 120%5=0

27. Given a number i, Print ith Fibonacci from 0 and it's sum

Input: 5

Output: 0 1 1 2 3

7 /// since 0+1+1+2+3=7

28. Given a number i, Print ith Fibonacci

Input: 5

Output: 3 ///5th number Fibonacci is 3

___Source (self-created)

Assignment – 02

1. Given an N X N integer matrix, , rotate it by 90 degrees
   Input output
   N=4

```
1,  2, 3, 4                    9, 6, 9, 1
9, 8, 5, 6          ->         2, 5, 8, 2
6, 5, 3, 7                     6, 3, 5, 3
9, 2, 6, 8                     8, 7, 6, 4
```

2. Given a m x n matrix, if an element is 0, set its entire row and column to 0. Do it in place.

```
Input
M=4, n=4;
1 0 2 3
1 2 3 4
3 4 5 6
5 6 7 8

Output:

0 0 0 0
1 0 3 4
3 0 5 6
5 0 7 8
```

3. Given a matrix of size n x m filled with 0′s and 1′s. if the matrix has 1 at (i,j), fill the column j and row i with 1′s
   Input:
   N=4,m=5

```
      1 1 0 1 0
0 0 0 0 0
0 1 0 0 0
1 0 1 1 0
```

   Output:

```
1 1 1 1 1
1 1 1 1 0
1 1 1 1 1
1 1 1 1 1
```

4.Given n*n matrix. Find the summation of it’s diagonal

   Input:
   n=4;

```
1 0 2 3
1 2 3 4
3 4 5 6
```

5 6 7 8

Output: 16.

5.Given n*n matrix sorted the row of the matrix according to descending order

Input:
n=4;
1 0 2 3
1 2 3 4
3 4 5 6
5 6 7 8

Output:

3 2 1 0
4 3 2 1
6 5 4 3
8 7 7 5

6. Given n*m matrix, find the maximum sum of its rows

Input:
N=3, m=5

1 2 3 4 5
2 3 4 5 6
3 4 5 6 7

Output: 25

7. Given a n*n size matrix. Print (“Yes”) if it’s identity matrix otherwise print(“No”)
Input: 3
1 0 0
0 1 0
0 0 1
Output: Yes

8. Given two m*n size matrix. Print the result of their addition
Input: 2 2 ///size

1 2
3 4 ///first matrix

4 5
-1 5///second matrix

Output:
5 7
2 9

9. Given two m*n size matrix. Print the result of their subtract
Input: 3 3 ///size

```
1 2 3
4 5 6
7 8 9 ///first matrix

9 8 7
6 5 4
3 2 1

Output:
-8 -6 -4
-2  0  2
 4  6  8
```

10. Given two matrix A & B. If A*B possible Print (“Possible”) and A*B it it’s not possible print (“Not possible”)

Input:

```
1 2 3
4 5 6
7 8 9 ///first matrix

9 8 7
6 5 4
3 2 1

Output: Yes
30 24 18
84 69 54
138 114 90
```

11. Given two m*n size matrix print (“Both matrices are equal” if they are equal otherwise print (“Both matrices are not equal”)

```
Input: 3 3///size
1 2 3
4 5 6
7 8 9 //first matrix

1 2 3
4 5 6
7 8 9 ///second matrix

Output: Both matrices are equal
```

12. Given m*n size matrix A. Find it’s determinant and print it

Input: 2 2///size

1 2
3 4
Output: -2

___Source (self-created)

Assignment – 03

1. Given a number (n) . print its root using bisection method

   Input: 4
   Output: 2
   Input: 2
   Output: 1.4142

2. Given an close interval [a,b]. If there are integers root print the value, otherwise print “none root” without quote using bisection method
   Input: 1 10
   Output: 1 4 9/// here 1, 4,9 belongs to interval 1 to 10 whose have root integer root 1,2 and 3
   Input: 5 8
   Output: none root /// include 5 to 8 there are no value which has integer root

3. Find the root of the equation x^2-4x-10=0 in the interval [-2, -1] using bisection method
4. Find the root of the equation x^3-x-1=0 in the interval [1, 2] using bisection method
5. Find the root of the equation sinx=10(x-1) using Newton-Raphson method where initial guess given
   Input: 1.5
   Output: 1.089
6. Find the root of the equation 3x-cos(x)-1=0 using Newton-Raphson method where initial guess given
   Input: 0.5
   Output: 0.608519

7. Find the root of the equation cos(x)-x*e^x=0 using Newton-Raphson method where initial guess given
   Input: 0.5
   Output: 0.518026

8. Find the root of the equation x^3-3*x-5=0 using false method where initial interval given [a, b]
   Input: 2 3
   Output: 2.279017

9. Find the root of the equation x^3-3*x+1=0 using false method where initial interval given [a, b]
   Input: 1 2
   Output: 1.532086

Assignment – 04

1. Write a C program to find the value of y at x=21 form the following data
   X: 20 23 26 29
   Y: 0.342 0.3970 0.4384 0.4848
   Output: 0.3583

2. Write a C program to find the value of y at x=28 form the following data
   X: 20 23 26 29
   Y: 0.342 0.3970 0.4384 0.4848
   Output: 0.46946

3. Write a C program to find the annual premium at the age of 30 form the following data
   X: 21 25 29 33
   Y: 0.342 14.27 15.81 17.72
   Output: 18.2606

4. Write a C program using Newton's divided difference formula to find the value of y at x=2 form the following data
   X: 20 4 5 7 10 11 14
   Y: 0.342 48 100 294 900 1210 2028
   Output: 4

5. Write a C program using Newton's divided difference formula to find the value of y at x=8 form the following data
   X: 20 4 5 7 10 11 14
   Y: 0.342 48 100 294 900 1210 2028
   Output: 448

6. Write a C program using Newton's divided difference formula to find the value of y at x=15 form the following data
   X: 20 4 5 7 10 11 14
   Y: 0.342 48 100 294 900 1210 2028
   Output: 3150

7. Write a C program using Lagrange's formula to find the value of y at x=1 form the following data
   X: 0 1 2 3 4
   Y: 3 6 11 18 27
   Output: 6

8. Write a C program using Lagrange's formula to find the value of y at x=2 form the following data
   X: 0 1 2 3 4
   Y: 3 6 11 18 27
   Output: 11

_Source "Numerical Analysis" by Titas

Assignment – 05

1. Write a C program to Calculate $\int_0^1 1/(1+x^2)\,dx$ by using Simpson's 1/3 rule
   Output: 0.7853

2. Write a C program to Calculate $\int_4^{5.2} ln\ \ dx$ by using Simpson's 1/3 rule
   Output: 1.8278

3. Write a C program to Calculate $\int_0^{\pi/2} sinx\ dx$ by using Simpson's 1/3 rule
   Output: 1.00

4. Write a C program to Calculate $\int_0^1 1/(1+x^2)\,dx$ by using Simpson's 3/8 rule
   Output: 0.78539

5. Write a C program to Calculate $\int_4^{5.2} ln\ \ dx$ by using Simpson's 3/8 rule
   Output: 1.82785

6. Write a C program to Calculate $\int_0^{\pi/2} sinx\ dx$ by using Simpson's 3/8 rule
   Output: 0.89458

7. Write a C program to Calculate $\int_0^1 1/(1+x^2)\,dx$ by using Trapezoidal rule
   Output: 1.0001

8. Write a C program to Calculate $\int_4^{5.2} lnx\ \ dx$ by using Trapezoidal rule
   Write a C program to Output: 1.82766

9. Write a C program to Calculate $\int_0^{\pi/2} sinx\ dx$ by using Trapezoidal rule
   Output: 0.9943

10. Write a C program to Calculate $\int_4^{5.2} ln\ dx$ by using Weddle's rule
    Output: 1.82785

_Source "Numerical Analysis" by Titas

Ahmed Kowsher(Shuvo)

Roll: ASH 1506029M

https://github.com/ahmedshuvo969