

## Introduction to Computer Programming and Data Structures

# Assignments 02

Maximum Marks: 100

Clarification Deadline: 2023-Feb-21

Submission Deadline: **2023-Feb-24**

### Assignment # AP0201

- Write a program that computes and prints the  $n$ th prime number.
- Input:  $n$
- Output:  $n$ th prime
- Hint: For  $a, b \in \mathbb{N}$ , if  $a \% b == 0$ , then  $a$  is divisible by  $b$ .
- Example: If input  $n = 5$ , the output will be 11 as the list of primes is [2, 3, 5, 7, 11, ...] and 11 is the 5th prime.

[20]

### Assignment # AP0202

- Write a program that outputs the maximum prime number you can find. Explain why the program outputs the maximum prime. You can use any type of variables and any library function. Your program should give the output within 1 minute.
- Input: none
- Output: The maximum prime number
- explanation should be written in the program file, using `/* your answer */` (in multiline comment)

[30]

### Assignment # AP0203

- Handling input choices: Suppose you have the following functions,
  1.  $area \leftarrow triangle\_area(a, b, c)$ : It takes the length of three edges of a triangle and outputs the area of that.
  2.  $length \leftarrow diag\_length(a, b, c)$ : It takes edges of a rectangular cuboid, outputs the length of its diagonal.
  3.  $ex\_val \leftarrow expo(x, y)$ : Given two real numbers (float/double)  $x$  and  $y$ , it outputs  $ex\_val = x^y$ .

Give the user four choices. Three choices to select the above function and one to exit. On user input, compute area/length/exponentiation and output the computed value. After each computation, the user will be given again four choices and continue until a choice for exit is chosen.

- Hint: To compute exponentiation, use `pow` function from `math.h` library

[10]

### Assignment # AP0204

- Problem: Given a positive integer  $n$  and a real number (float)  $a$ , compute  $a^n$  without using `pow` function from `math.h` library.
- Input:  $n$   $a$
- Output:  $a^n$

[10]

### Assignment # AP0205

- Problem: Given a positive integer  $n$  and a real number (float)  $a$ , compute  $a^n$  using square-and-multiply method.
- Input:  $n$   $a$
- Output:  $a^n$

[30]