

CS-1002 Programming Fundamentals Spring-2025

ASSIGNMENT-01

Instructions:

Dear students we will be using auto-grading tools, so failure to submit according to the below format would result in zero marks in the relevant evaluation instrument.

- i. For each question in your assignment, make a separate cpp file e.g. for question 1, make ROLL-NUM_SECTION_Q#.cpp (24i-0001_Q1.cpp) and so on. Each file that you submit must contain your name, student-id, and assignment # on top of the file in comments.
- ii. Combine all your work in one folder. The folder must contain only .cpp files (no binaries, no exe files etc.).
- iii. Run and test your program on a lab machine before submission.
- iv. Rename the folder as ROLL-NUM_SECTION (e.g. 24i-0001) and compress the folder as a zip file. (e.g. 24i-0001.zip). do not submit .rar file.
- v. Submit the .zip file on Google Classroom within the deadline.
- vi. Submission other than Google classroom (e.g. email etc.) will not be accepted.
- vii. The student is solely responsible to check the final zip files for issues like corrupt file, virus in the file, mistakenly exe sent. If we cannot download the file from Google classroom due to any reason it will lead to zero marks in the assignment.
- viii. Displayed output should be well mannered and well presented. Use appropriate comments and indentation in your source code.
- ix. **Total Marks: 60.**
- x. **The AIM of this assignment is to give you practice with bitwise and arithmetic operator's (chapters 2 and 3 of textbook). Zero marks will be awarded if advance topics (e.g., if, if else or loops etc.) used. Do not use any built-in function other than pow function (#include <cmath>).**
- xi. If there is a syntax error in code, zero marks will be awarded in that part of assignment.
- xii. Your code must be generic.

Deadline: Deadline to submit assignment is 09th February 2025 11:00 PM. You are supposed to submit your assignment on GOOGLE CLASSROOM (CLASSROOM TAB). Only ".ZIP" files are acceptable. Other formats should be directly given ZERO. Correct and timely submission of the assignment is the responsibility of every student, hence no relaxation will be given to anyone. Late Submission policy will be applied as described in course outline.

Tip: For timely completion of the assignment, start as early as possible.

Plagiarism: Plagiarism is not allowed. If found plagiarized, you will be awarded zero marks in the assignment (copying from the internet is the easiest way to get caught).

Note: Follow the given instruction to the letter, failing to do so will result in a zero.

(Marks 5) Question 01: Write a C++ program which accepts a Uppercase alphabet as input and convert it to lower case alphabet.

Example 01: Input: A

Output: a

Example 02: Input: Z

Output: z

(Marks 5) Question2: Write a program that prints the following using cout statements.



(Marks 10) Question 03: Write a C++ program that outputs **FAST Main Building pattern** using I/O manipulator <iomanip> appropriately (*i.e. setw functons*). The output will vary based on two inputs that the user will provide: window style and grass style. By simply changing the input characters, the output will change (somewhat) dramatically. In the end, your program must match the outputs shown for the give characters for window and grass style EXACTLY. (*Note: You cannot use any string literals containing spaces in cout. And use single cout statment*)

Here is the sample program output with an input character & for window style and ~ for grass style:

```

Enter the window style for the FAST Main Building: &
Enter the grass style for the FAST Main Building: ~

      !                @                !
      (*)              (***             (*)
      (***)           (((***)          (***)
      |#|#|#|         ((|#|#|#|))       |#|#|#|
      *****        #####            *****
    /\              /\              /\
   | | | | & & & & | | | | & & & | | | | & & & | | | |
   | | | | & & & & | | | | & & & | | | | & & & | | | |
   | | | | & & & & | | | | & & & | | | | & & & | | | |
   | | | | & & & & | | | | & & & | | | | & & & | | | |
   | | | | & & & & | | | | & & & | | | | & & & | | | |
  /\  ~ ~ ~ ~ ~ ~ ~ ~  /\  /\  ~ ~ ~ ~ ~ ~ ~ ~  /\


```

Here is the sample program output with an input character f for window style and % for grass style:

```

Enter the window style for the FAST Main Building: f
Enter the grass style for the FAST Main Building: %

      !                @                !
      (*)              (***             (*)
      (***)           (((***)          (***)
      |#|#|#|         ((|#|#|#|))       |#|#|#|
      *****        #####            *****
    /\              /\              /\
   | | | | f f f f | | | | f f f | | | | f f f f | | | |
   | | | | f f f f | | | | f f f | | | | f f f f | | | |
   | | | | f f f f | | | | f f f | | | | f f f f | | | |
   | | | | f f f f | | | | f f f | | | | f f f f | | | |
   | | | | f f f f | | | | f f f | | | | f f f f | | | |
  /\  % % % % % % % %  /\  /\  % % % % % % % %  /\


```

(Marks 10) Question 04: Write a C++ program to calculate the given below formula. The value of i, a and b needs to be input by user while u = 3 and p = 4 (all the variable's data type must be int except result (double)).

$$\text{result} = \frac{\sqrt{\mu(i)^{\frac{a}{b}}(i^2 - 1)}}{\sqrt{\rho(i) - 2} + \sqrt{\rho(i) - 1}}$$

Example:

Input i, a and b are 2, 3 and 4

Result = 0.7635

(Marks 05) Question 05: Write a C++ program in which you declare variables that will hold an hourly wage, a number of hours worked, and a withholding tax (percentage deduction). Prompt the user to enter values for each of these fields. Compute and display net pay.

Example01:

Enter hourly wage: 900

Enter number of hours: 3

Enter withholding tax: 25

Net Pay:2025

Example02:

Enter hourly wage: 1600

Enter number of hours: 3

Enter withholding tax: 25

Net Pay:3600

(Marks 05) Question 06: Write a C++ program which accepts amount in rupees as input (integer) within Range from Rs. 100 to Rs. 100000 and then display the total number of Currency Notes of Rs. 500, 100, 50, 20, 10, 5 and 1.

For example: when a user enters a number, Rs. 57477

Currency Note	:	Number
500	:	114
100	:	4
50	:	1
20	:	1
10	:	0
5	:	1
1	:	2

(Marks 10) Question 07: To save disk space Time field in the directory entry is 2 bytes long. Distribution of different bits which account for hours, minutes and seconds is given below:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
H	H	H	H	M	M	M	M	M	M	S	S	S	S	S	S

Write a C++ Program that take input two-byte time entry and appropriately separates hours, minutes and seconds using suitable bitwise operators. Think cleverly. The program executes in following manner:

Example 01:

Enter a two-byte Time Value: 8849

Time is 2 hrs 10 mins 17 secs

Example 02:

Enter a two-byte Time Value: 4879

Time is 1 hrs 12 mins 15 secs

(Marks 10) Question 08: Write a program, which takes two 8-bit integers value and add them. Remember, you can only use bitwise (& | ^ ~ etc.) or assignment (=) operators for this problem.

Example01:

Enter number 1: 25

Enter number 2: 63

Output: 88

Example02:

Enter number 1: 15

Enter number 2: 7

Output: 22

Enjoy Coding