

Reg. No.

CSE1 Group-2 Subgroup-A Even



Indian Institute of Information Technology, Surat
Department of Computer Science & Engineering
End Semester Lab Examination, 1st Sem, 2025-26
Fundamentals of Computer and C Programming (CS101)

Timing: 11:00 AM to 1:00 PM

Date: Nov 18, 2025

Marks: 25

Instructions:

- Work on the computer assigned to you. You should log-in with the **exam** user whose details are given on the board.
- You will have **45 minutes** to code the solutions to both the problems.
- After 45 minutes, you must stop coding. **Do not modify** your code after this time.
- The remaining time will be used for a **viva** (oral examination). Lab instructors will evaluate your code and ask questions about your solution and related concepts.
- You will be graded on:
 - **Correctness:** Does the program work as specified? Does it handle all the edge cases? Code that does not compile at the end of 45 minutes will receive a **zero** for the 'correctness' portion.
 - **Adherence to instructions:** Does the program follow all instructions, such as writing functions with specified function prototypes or using specified structures? Does the program print appropriate user instructions and error messages?
 - **Best practices:** Code clarity, proper indentation, use of comments, and variable naming.
- Since we do not have an uninterrupted power supply, please save your work frequently.
- You may (and should!) carry pen and blank paper with you, but no other devices including phones, smartwatches, and calculators are allowed.
- You must write your solutions in C. You may include any library that is present on your system. Lab instructors will not debug or help compile your code.

1. December 2025 Day Finder

(10)

Write a C program that asks a user to enter a single integer representing a date for December 2025. Your program must validate the input. A date is considered valid for December if it is between 1 and 31 (inclusive).

- If the date is valid, print the corresponding day of the week (e.g., "Monday", "Tuesday").
- If the date is invalid, print an error message (e.g., "Invalid date").

Note that December 1, 2025, is a Monday.

E.g.: On input **13** (the last day of the exams!) you should output **Saturday**.

2. Polynomial Integration

(10)

The indefinite integration of a polynomial $P(x) = c_0 + c_1x + c_2x^2 + \dots + c_nx^n$ is given by $Q(x) = C + c_0x + (c_1/2)x^2 + (c_2/3)x^3 + \dots + (c_n/(n+1))x^{n+1}$. Write a C program that asks a user to enter an integer n . You may assume that $n \geq 0$ and $n \leq 10$. Then, scan $n+1$ double coefficients in the structure given below. You must also initialize the rest of the coefficients to 0.0 .

```
#define MAX_DEG 10
struct Polynomial {
    /* coeffs[i] stores the coefficient for  $x^i$ . For  $i >$ 
    degree(polynomial) the respective coefficients are  $0.0$  */
    double coeffs[MAX_DEG + 1];
};
```

Finally, evaluate the definite integral $Q(1.0) - Q(0.0)$ by implementing function `double eval_integral(struct Polynomial P);` It is highly recommended to write a helper function `double eval_antideriv(struct Polynomial P, double x);` that calculates $Q(x)$ (you can assume the constant $C=0$). Then, your `eval_integral(P)` function can simply return `eval_antideriv(P, 1.0) - eval_antideriv(P, 0.0)`.

E.g.: On input $n=2$ and coefficients `1 2 3` you should output `3.0`.

Explanation: Corresponding polynomial is $P(x) = 1 + 2x + 3x^2$ with antiderivative $Q(x) = x + x^2 + x^3$. Thus, $\int_0^1 P(x)dx = Q(1) - Q(0) = 3 - 0 = 3$.