CS3101: Programming and Data Structures I
Class Test 2 (Slot 2)

Starts: 29/10/2025 at 7:30 PM IST (Duration: 1 hour 30 mins) **Total marks: 25**

Instructions

- All programs should be compatible with GNU C.
- Late submissions will attract marks deduction.
- You are advised to compile the code before submitting it to WeLearn. If a code does not compile at our end, marks will be deducted for the problem.
- Each program should follow a strict naming convention: **QNo.c** (e.g. Q1.c, Q2a.c etc.). Programs not adhering to the convention will not be evaluated.
- All codes (.c files) should be submitted in a single zipped folder to WeLearn.
- You should put appropriate comments in the code.

1. **(Marks: 10)** Write a C program to take a name (e.g. SURYA) as input from the terminal and print it in the way shown in Figure 1 (there is **one** new line after every line). If the string is of even length, you should not print anything.

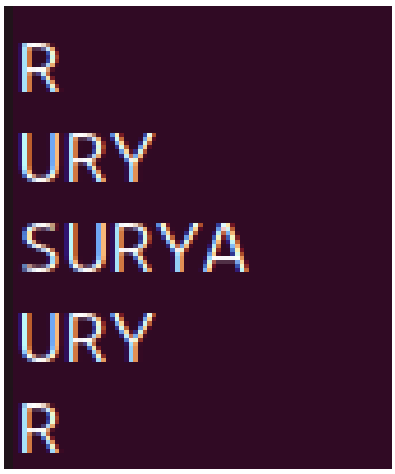

Figure 1: Pattern for Q1

2. **(Marks: 10)** Consider a corporate employee database in C where each employee has *name* (a string), *ID* (an integer), *age* (an integer) and *role* (a string). Example roles can be *developer*, *scientist*, *principal scientist* etc. Design a structure (using `struct`) named **EMPLOYEE** for this database and store the record of 10 employees spanning across different roles in an *array of structures*, which is *sorted on ID in ascending order* (you may store the employee records such that the array is sorted; you DO NOT have to write a sorting algorithm for it). Write a function **retAvgAge()** that takes this array as an argument and returns the average age of the employees for a given role (also passed as an argument); you should return -1 if the role is not found in the database. In addition, write as a comment in the program, the time complexity of the function **retAvgAge()** in terms of `big Oh` notation.

3. **(Marks: 5)** A **Spy Number** is a special number in mathematics where the sum of its digits equals the product of its digits. E.g., 1124 is a Spy Number because $1 + 1 + 2 + 4 = 1 \times 1 \times 2 \times 4$. Implement a function `isSpy()` in C that takes an integer as an argument and returns if it is a Spy number or not.