CS3101: Programming and Data Structures I
Class Test 3 (Slot 2)

Starts: 19/11/2025 at 7:30 PM IST (Duration: 1 hour 45 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: 12)** Write a program to print the index of the **first occurrence** of a particular number (e.g., 3) in a sorted (ascending) array (e.g., 2, 2, 3, 3, 3, 4, 4, 5, 5) of length n, in $\mathcal{O}(log(n))$ time.
2. **(Marks: 5)** Write a *recursive* function `printHalfRev()` to print the halves of the first n natural numbers, (n taken as input from the user and passed as an argument to `printHalfRev()`), in reverse order (i.e. if $n = 5$, you print 2.5, 2, 1.5, 1, 0.5).
3. **(Marks: 8)** Given two vectors (of any dimension), write your own function `dot()` taking these two vectors as arguments and returning the dot product of the same, store in your own header file `myheader.h`, and call the same from main.