CS2201: Introduction to Computation
Class Test 1 : Monday Group (27/01/2025 10:15AM)

Duration: 1.5 hours **Total marks: 15**

Instructions

- All programs should be compatible with Python 3.
- There will be a plagiarism check. The suspected copies will attract a deduction of marks for the problem irrespective of who the original author of the code is. Copying from the internet will also be considered as plagiarism. However, you may reuse the codes shared by the instructor.
- 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.py** (e.g. Q1.py, Q2a.py etc.). Programs not adhering to the convention will not be considered for evaluation.
- All codes (.py files) should be submitted in a single zipped folder named **YourWeLearnID.zip** (e.g. 23MS123.zip) to WeLearn.
- You should put appropriate comments in the code without which marks will be deducted.

1. (a) **(Marks: 5)** Given the function $f(x) = e^x$ - 5, use the Tabulation method to find an interval in the initial interval [1, 2] containing the root of the equation $f(x) = 0$ with a step length of 0.1.

   (b) **(Marks: 5)** In the interval determined by the Tabulation method, use the Newton-Raphson method to find a better approximation of the root, up to any desired accuracy decided by you. Note that the derivative of $f(x)$, $f'(x) = e^x$.

2. **(Marks: 5)** Generate the pattern in Figure 1 for any natural number n (the figure shows the output for $n = 10$).

   Note: It is not necessary to maintain the exact number of spaces (at least one space should be printed) or the number of new lines after every line (there must be at least one newline after every line of the pattern).

Figure 1: Figure for Q2 (for n = 10)