CSE2023 - ASSIGNMENT #5

Solve the following questions from course book. (Discrete Mathematics and Discrete Mathematics and Its Applications, 7th Ed. by Kenneth Rosen)

Note that we may grade selected questions from HWs.

* Show all your works.

1) Find the solution to $a_n = 3a_{n-1} + a_{n-2} - 3a_{n-3}$ for $n = 3, 4, 5, \ldots$, with $a_0 = 4$, $a_1 = 10$, and $a_2 = 12$.

2) Find the solution of the recurrence relation $a_n = 3a_{n-1} + 5 \cdot 3^n$.

3) A new employee at an exciting new software company starts with a salary of $2000 and is promised that at the end of each year her salary will be double her salary of the previous year, with an extra increment of $150 for each year she has been with the company.
   a) Construct a recurrence relation for her salary for her nth year of employment.
   b) Solve this recurrence relation to find her salary for her nth year of employment

4) Let R be the relation on the set of people with doctorates such that $(a, b) \in R$ if and only if *a* was the thesis advisor of *b*. When is an ordered pair (a, b) in R^2? When is an ordered pair (a, b) in R^n, when *n* is a positive integer? (Assume that every person with a doctorate has a thesis advisor.)

5) How can the matrix for R^{-1}, the inverse of the relation R, be found from the matrix representing R, when R is a relation on a finite set A?

Submission Instruction (10p)
Please zip and submit all your files using filename YourNumberHW5.zip
(ex: 150629573HW5.zip) to Canvas system (under Assignments tab).

Your zip file should contain the following:
1. Single PDF file for solutions (150629573HW5.pdf)

Notes:

1. Write your name and student ID on each sheet.
2. No late submission will be accepted