BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY

SUBJECT: DISCRETE MATHEMATICS (CSE 103)

BOOK EXERCISE PROBLEMS(CHAPTER-1, SECTION-2)

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LEVEL-1 TERM -2

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QUESTION : (CHAPTER 1, EXERCISE 2, QUESTION NO. 33**)**

Steve would like to determine the relative salaries of three coworkers using two facts. First, he knows that if Fred is not the highest paid of the three, then Janice is. Second, he knows that if Janice is not the lowest paid, then Maggie is paid the most. Is it possible to determine the relative salaries of Fred, Maggie, and Janice from what Steve knows? If so, who is paid the most and who the least? Explain your reasoning.

SOLUTION :

Because of the first piece of information that Steve has, let's assume first that

1. Fred is not the highest paid.

Then Janice is the highest paid employee according to statement 1.
Therefore, Janice is not the lowest paid, so by the second statement,
Maggie is the highest paid. But that is a contradiction (as both Maggie and Janice cannot be highest paid).

Interpretation: By logical analysis, Fred is the highest paid.

Next let's assume that

2. Fred is the highest paid.

So Janice is not the highest paid.
Then if we assume that Janice is not the lowest paid, then according to statement 2, we have Maggie to be the highest paid, which is a contradiction to the first statement.
Hence Janice has to be the lowest paid employee.

Interpretation: Janice is the lowest paid and Maggie's salary is between that of Fred and Janice.

CONCLUSION: Order of salary –
Fred> Maggie> Janice .