TIE4203 Decision Analysis in Industrial & Operations Management
Solutions to Assignment #1

Question 1.

- 94 of the 100 known cases tested positive.
  True positive rate = 94/100 = 0.9400

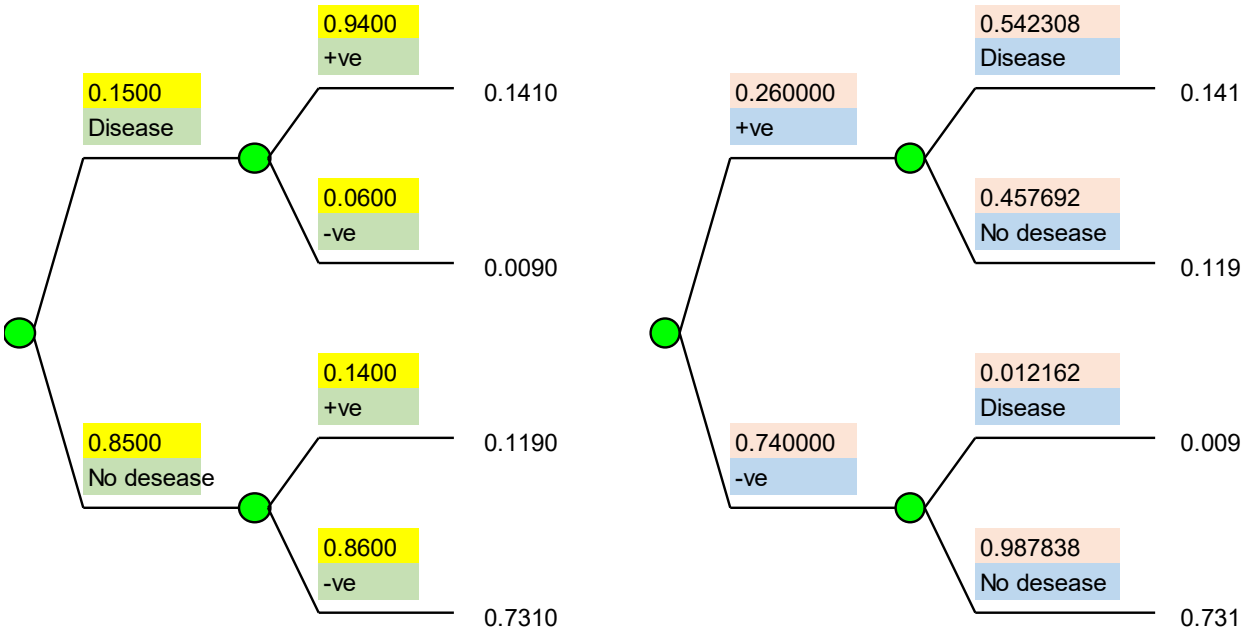
  Hence sensitivity of the test = **<u>0.9400</u>**

- 21 of the 150 control (no disease) cases tested positive.

  Hence specificity of the test = 1 – (21/150) = **<u>0.8600</u>**

Question 2.

- Flip the probability tree:



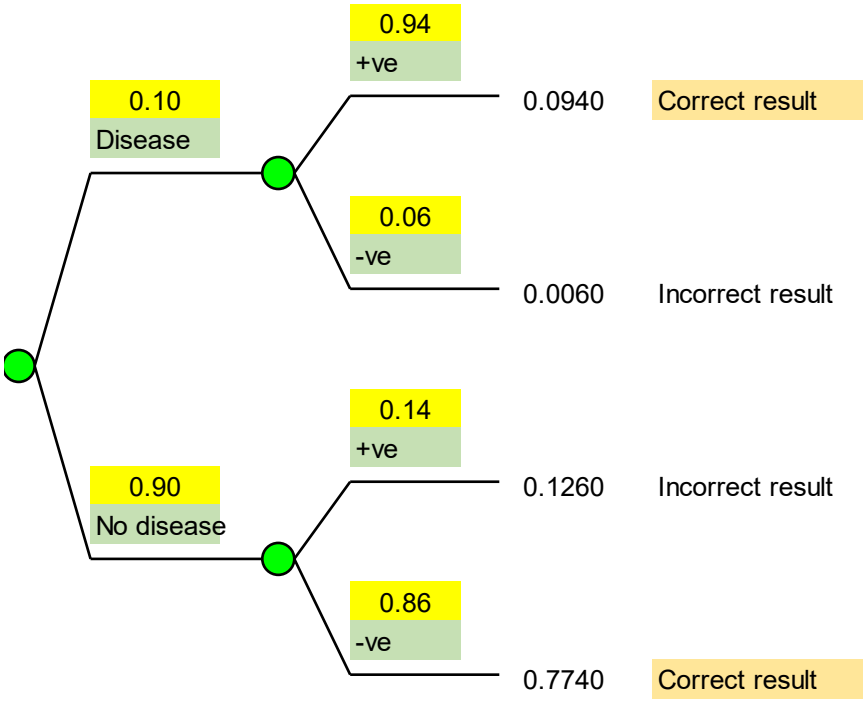
- From the flipped tree:

  (*a*) If the result is positive, the probability that John is infected = **<u>0.542308</u>**

  (*b*) If the result is negative, the probability that John is not infected = **<u>0.987838</u>**

Question 3.

- Prevalence rate = 0.10
- Sensitivity = 0.94
- Specificity = 0.86
- Population size = 20,000



- From the probability tree:
  - Accuracy of the test for the population = 0.0940 + 0.7740 = 0.8680
  - Expected number of people corrected diagnosed = 20,000 (0.8600) = **<u>17,300</u>**