

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

### Question 1.

- 90 of the 100 known cases tested positive.  
True positive rate =  $90/100 = 0.9$

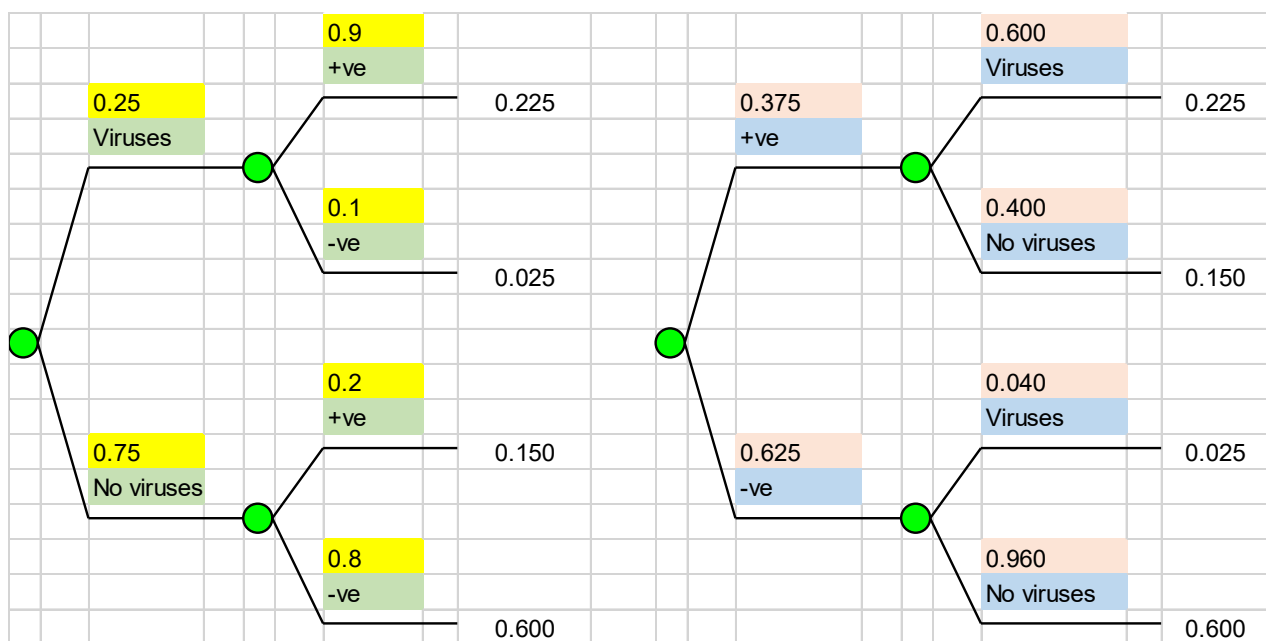
Hence sensitivity of the test = **0.9**

- 30 of the 200 control (no disease) cases tested positive.  
False positive rate =  $30/200 = 0.15$

Hence specificity of the test =  $1 - 0.15 = \mathbf{0.85}$

### Question 2.

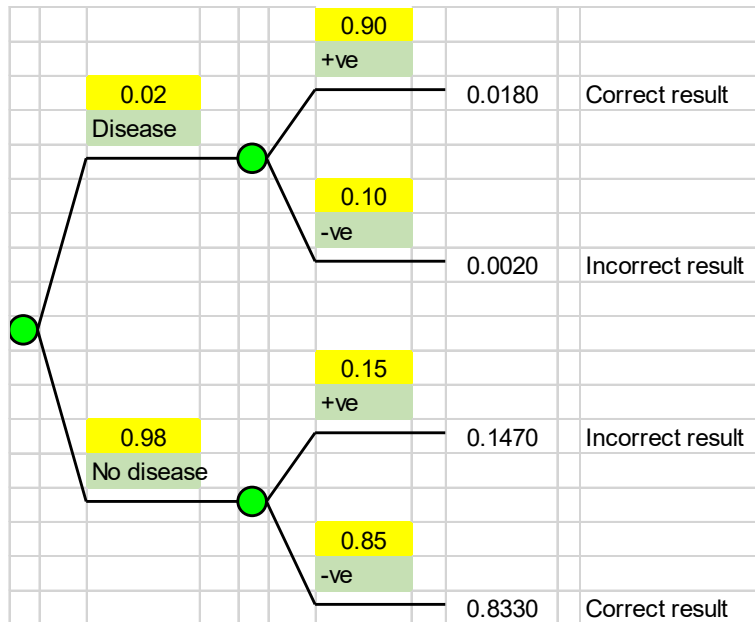
- Flip the tree:



- From the flipped tree:
  - (a) If the result is positive, probability that Mr. Tan is infected by the viruses = **0.60**
  - (b) If the result is negative, probability that Mr. Tan is infected by the viruses = **0.04**

### Question 3.

- Prevalence rate = 0.02
- Sensitivity = 0.90
- Specificity = 0.85
- Population size = 10,000



- From the probability tree, expected number of people with correct test results  
 $= 10,000 (0.0180 + 0.8330)$   
 $= \mathbf{8,510}$