False Positive

Almost all medical tests have a small chance of a 'false positive' or a 'false negative'.

- **False positive**: The test says you **do** have the condition when you really **don't**.
(you're fine, but the test thinks you're sick)
- **False negative**: The test says you **don't** have the condition when you really **do**.
(you're sick, but the test thinks you're fine)

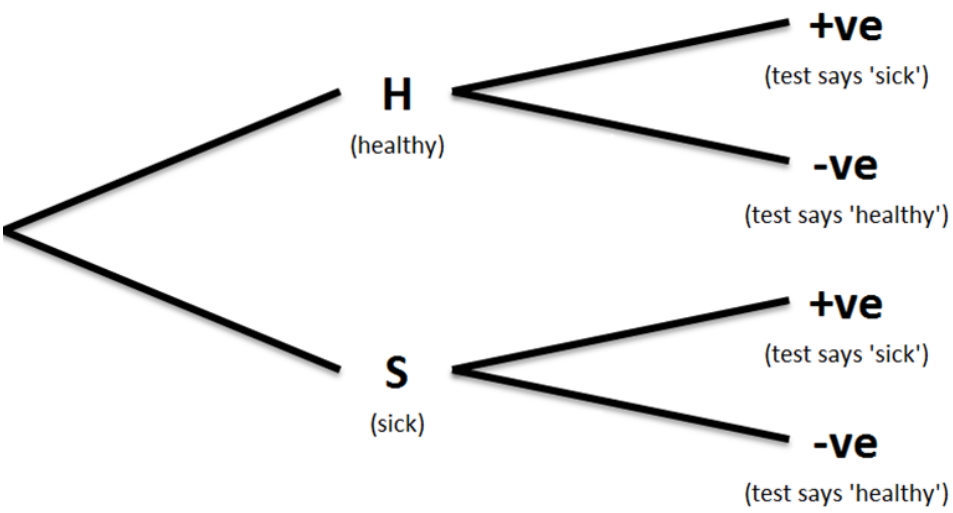
- The test for a particular disease has a false positive rate of 5%.

*This means that 5% of people who **don't** have the disease will be told that they **do**.*

- The test has a false negative rate of 1%.

*This means that 1% of people who **do** have the disease will be told that they **don't**.*

Assuming this particular disease affects 10% of people, complete the tree diagram below:



Use the tree diagram to calculate the probabilities for each of the four outcomes:

	Healthy	Sick
Tested Positive		
Tested Negative		

You're sick, and the test was correct

You're sick, but the test thinks you're fine
FALSE NEGATIVE:
You may not get the treatment you need.

You're fine, but the test thinks you're sick
FALSE POSITIVE:
You may get treatment you don't need, or be worried for no reason.

You're fine, and the test was correct

If the test says I'm sick, what is the chance that I really am?

Hint: Imagine 1000 people take the test. Work out how many would test positive, and out of those people, how many are really sick?

False Positive SOLUTIONS

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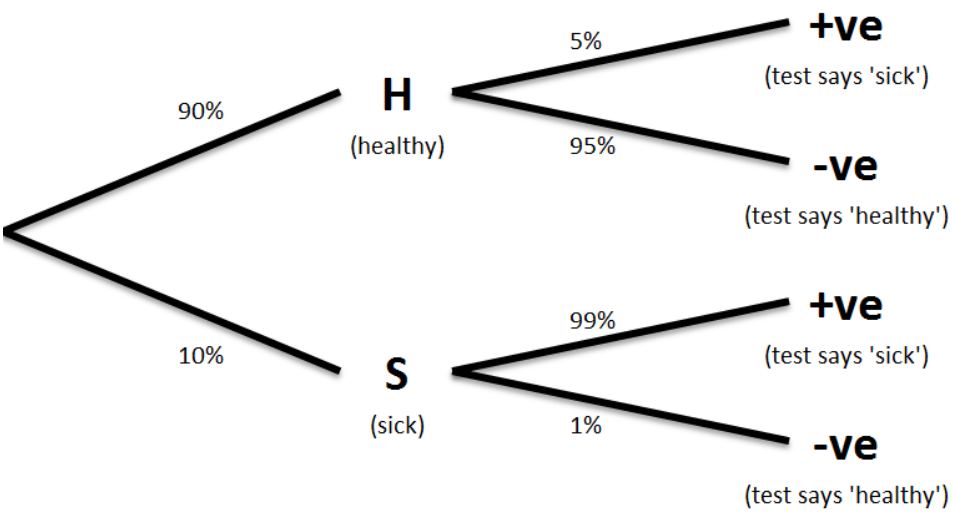

Use the tree diagram to calculate the probabilities for each of the four outcomes:

$0.9 \times 0.05 = \mathbf{0.045}$ $0.9 \times 0.95 = \mathbf{0.855}$ $0.1 \times 0.99 = \mathbf{9.9}$ $0.1 \times 0.01 = \mathbf{0.001}$

	Healthy	Sick
Tested Positive	**4.5%**	**9.9%**
Tested Negative	**85.5%**	**0.1%**

You're sick, and the test was correct

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You're fine, and the test was correct

If the test says I'm sick, what is the chance that I really am?

For every 1000 *people,* $45 + 99 = 144$ *of the population will test positive.*
Of that 144, 99 *are genuinely sick.*

$\frac{99}{144} = 0.6875 = \mathbf{68.75\%}$ ***chance that you're really sick.***