1. 

(a) 99% (this is the meaning of the sentence “The test has an accuracy rate of 99%, that is, 99 out of 100 students with the disease will give a positive result”).

(b) Let D be the event “the student has the disease” and “T” the event “the student gives a positive result to the test”. The table uses the information that P(D) = 0.001 (i.e. 0.1%), P(T | D) = 0.99 and P(not T | not D) = 0.99.

<table>
<thead>
<tr>
<th>Have the disease</th>
<th>Do not have the disease</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive test</td>
<td>99</td>
<td>999</td>
</tr>
<tr>
<td>Negative test</td>
<td>1</td>
<td>98,901</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>99,900</td>
</tr>
</tbody>
</table>

(c) By Bayes’ rule, 

\[ P(D | T) = \frac{P(D \cap T)}{P(T)} \]

From the above table we get that 

\[ P(D \cap T) = \frac{99}{100,000} \]

and 

\[ P(T) = \frac{1,098}{100,000} \]

Thus, 

\[ P(D | T) = \frac{99}{1098} = \frac{11}{122} = 9.0164\% \]

A direct calculation using Bayes rule and without filling in the table above is as follows:

\[ P(D | T) = \frac{P(T | D) P(D)}{P(T | D) P(D) + P(T | not D) P(not D)} = \frac{0.99(0.001)}{0.99(0.001) + 0.1(0.999)} = \frac{11}{122} = 9.0164\% \]

2. (a) The extensive form is shown below.

(b) (TT,RR) is not a Nash equilibrium. Player 1’s payoff is: \( \frac{1}{4}(2 + 0 + 2 + 1) = \frac{5}{4} \). I Player 1 switched to the strategy TB then his payoff would be \( \frac{1}{4}(2 + 2 + 2 + 2) = 2 \).
Top number is Player 1's payoff, bottom number is Player 2's payoff