1)
i) Yes it does. If all paths of the program are traversed, then every statement in each of those paths are also executed.

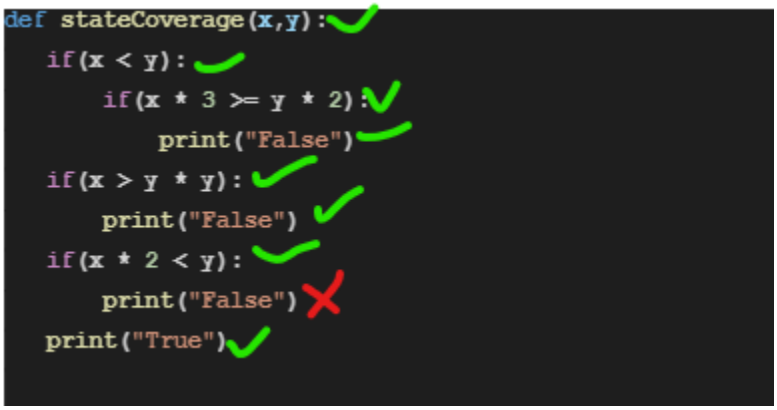
ii) No it does not. One easy way to show that this is the case is using the fact that some branches can have no statements in them, and thus having every statement executed doesn't actually test each branch.

iii) With (i), any program with full branch coverage should have full statement coverage. The idea of a branch in the lowest level is just a conditional jmp instruction, so if each of those conditions are tested, then every instruction will be executed.

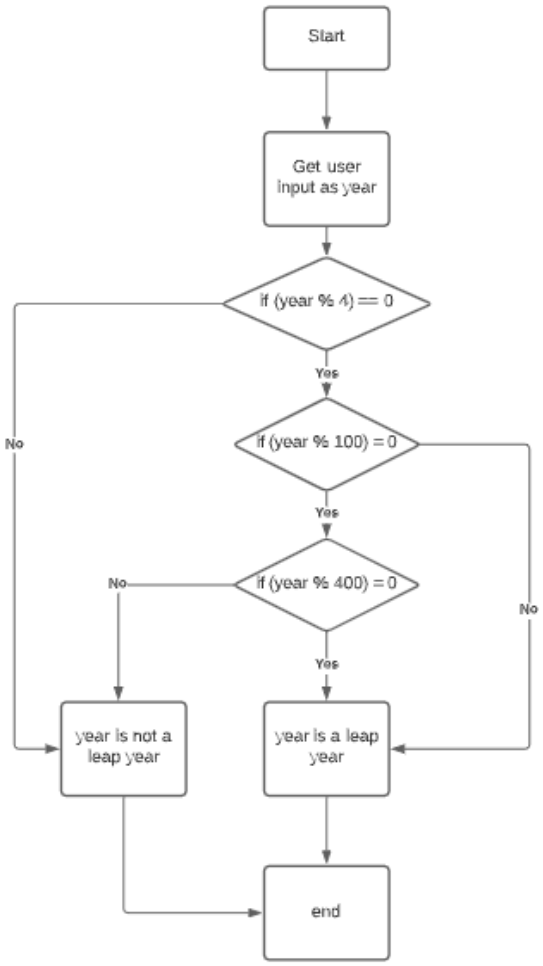
With (ii), an example would be having a program that has some sort of error handling exception. In this case, you can have every statement executed without triggering the exception if you only use good inputs, but then not every branch of the program would be covered.

2)

Inputs	Coverage %
a = 1/6, b = 1/4	88.9 %



3)
i)



ii)
Statement coverage: An input of 400 for the year would result in a statement coverage of 4/10, or 40%, which is the best that can be done with one input. This is due to there being many nested if statements which are made to only end on certain inputs, thus one input is nowhere near enough to cover all the statements. Adding additional test inputs like 1997, 2004, and 1900 would be enough to get 100% branch coverage.

Branch coverage: An input of 400 for the year would result in a branch coverage of 3/6, or 50%, which is the best that can be done with this flow chart. If you wanted to cover all branches with multiple tests, then you could add on inputs of 1997, 2004, and 1900, each covering 1/3 of the branches to add up to the other 50%.

4)
i)

Inputs	Output	Statement coverage
hour = 13, temp = 77	Eat lunch go swim	100%
hour = 14, temp = 74	Eat lunch go	89%

ii) To get statement coverage, you divide the number of statements executed by the total number of statements in the program. In this code, there are 9 total statements. In the first set of inputs, all branches get covered, so all statements get covered, leaving 9/9 statements. For the second set, the last branch isn't traversed, leaving only 8/9 statements covered.