**IIT CS536: Science of Programming**

Homework 2: State and IMP

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**Task 1.1**

**Task 1.2**

1. this satisfaction holds for the state . As square of all integers are greater or equal to 0.
2. this does not hold for the state as value of in this state which is 2 is not greater than value of in this state which is equal to 4.
3. this holds for the state . For all integers , . So, in this state if is false, the implication statement will be true as false implies anything is true. If is true, then will always be greater than 0 which means implication is true. So, it holds for the given state.
4. this statement does not hold for the given state . As it suggests that there is y such that , but as we know no integer when multiplied by to is equal to 5 as it is an odd number.

**Task 1.3**

1. Holds if for some states , it is true that for some and all
2. Holds if for is no states , it is true that for all and some

**Task 2.1**

**Task 2.2**

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**Task 2.3**

1. . So, is the big step semantics for the statement S. It takes statement and state and results in a final state of the program. In the above example I just used recursive version of while statement to show the logic but we can just simply continue evaluating until state does not satisfy the stamen and consider that a final state and the result of the function.

**Task 3.1**

I have spent around 5 hours for this assignment.