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Task 1.1

a. False.

Verification ensures that the program covers all the functionalities and it is correct. It also check if the program doesn't take long.

b. True

Testing ensures that different real world scenarios are covered. while Verification measures if the intended specifications are met.

Task 1.2

a. (I) d. (III)

b. (III) e. (II)

c. (II)

2. propositional logic

Task 2.1

It is contingency. The result of $(P \to Q) \to (\neg P \to \neg Q)$ is not all true or all false. It depends on the value of P & Q hence it is a contingency.

Task 2.2

Attached the log file.

Task 2.3

That it is a logical equivalence. $P \Leftrightarrow P$ means $P \Rightarrow T$ & $T \Rightarrow Q$. Also it shows T is tautology.

Task 2.4

Attached the log file

3. Predicate Logic

Task 3.1

$$\forall_n \in Z\Big[(n>2 \wedge n\%2=0) \Rightarrow \exists_p \in M\ \exists_q \in M(n=p+q \wedge p,q>1 \wedge \forall_m \in Z((m>1 \wedge m<p) \Rightarrow \neg(p \% m=0)) \wedge \forall_m \in Z((m>1 \wedge m<q) \Rightarrow \neg(q \% m=0)))\Big]$$

Task 3.2

a. False.

This statement has counterexample, if $x=4$ and $y=4$ then x is not less than y. Hence the statement is not universally true for all integers.

b. True

This statement states that x can not be expressed as multiplication of a & b which is greater than 1 since it's the characteristics of Prime.

c. True

This statement states that every x can be multiplied by 2 ~~so~~ there exist y.

Task 3.3

Attached the log file.

Task 4.1

It took me 6-8 hours to finish the assignment.