

Homework – 02

Topic(s) De Morgan's Law + Implication

1. Use De Morgan's law to write *negation* of following sentences in *intelligible* English.
 - a) The food is expensive but not healthy.
 - b) Object Oriented Programming is interesting but difficult.
 - c) If you waste your time, time will waste you.
 - d) If you have A in the programming then you can choose this course.
 - e) The question paper was hard or you were not well prepared.
 - f) If the food is expensive then it's healthy.
 - g) A recursive function uses more memory and time.
2. Develop truth tables for each of the following. [Operators' Precedence (from highest to lowest): \neg , \wedge , \vee , \rightarrow]
 - a) $p \vee (\neg p \wedge q) \rightarrow q$
 - b) $p \vee (\neg p \wedge q) \rightarrow \neg q$
 - c) $(p \rightarrow q) \rightarrow (q \rightarrow p)$
 - d) $(p \oplus q) \rightarrow (p \oplus \neg q)$
 - e) $(p \rightarrow \neg q) \rightarrow (q \rightarrow \neg p)$
3. Let p, q, r denote the propositions: p : $\triangle ABC$ is isosceles, q : $\triangle ABC$ is equilateral and r : $\triangle ABC$ is equiangular. Translate each of the following into intelligible English.
 - a) $q \rightarrow p$
 - b) $\neg p \rightarrow \neg q$
 - c) $p \wedge \neg q$
 - d) $r \rightarrow p$
4. Write down the converse and the contrapositive of the following propositions.
 - a) If the input file exists, then an error message is not generated.
 - b) If the database is not accessible, then my program cannot run.
 - c) If my program contains no bugs, then it produces correct output.
 - d) If the file is not damaged and the processor is fast, then the printer is slow.
 - e) A square is a four sided figure.
 - f) If $\triangle BAC$ is right triangle, then $a^2 = b^2 + c^2$
 - g) If $0 + 0 = 0$, then $1 + 1 = 1$.
5. Is it possible for both an implication and its converse to be false? Explain your answer.
