CONTENTS

Homework – 01

Topic: Compound Propositions using ¬, ∧, ∨, ⊕

1. Develop truth tables for the following compound propositions.

    a) $(p \wedge q) \vee (\neg p \vee (p \wedge \neg q)) \vee r$

    b) $(p \wedge \neg q) \wedge (\neg p \vee q) \wedge r$

    c) $((\neg p \wedge q) \wedge (q \vee r)) \wedge \neg q \wedge r$

2. Let h: "Amir is handsome", c: "Amir is clever", p: "Amir is optimistic". Rewrite the following in symbolic forms using ¬, ∧, ∨ and ⊕. You should not simplify the compound propositions.

    a) Amir is handsome and clever but not optimistic.

    b) Amir is either clever or handsome or both.

    c) Amir is either clever or handsome but not both.

    d) Amir is neither handsome, nor clever nor optimistic.

    e) Amir is not both handsome and clever, but he is optimistic.

    f) Amir is optimistic but not clever nor handsome.

3. Let p, q, and r be the propositions:

    p : You get an A on the final exam.

    q : You do every exercise in this book.

    r : You get an A in this class.

    Express the following in symbolic form:

    a) You get an A in this class, but you do not do every exercise in this book.

    b) You get an A on the final, you do every exercise in this book, and you get an A in this class.

    c) You get an A on the final, but you don't do every exercise in this book; nevertheless, you get an A in this class.

4. Consider the simple propositions: r: Roses are red, b: Violets are blue and s: Sugar is sweet. Translate the following statements into intelligible English.

    a) $b \vee \neg s$

    b) $r \vee (b \wedge \neg s)$

    c) $(r \vee b) \wedge \neg s$

5. Consider the proposition labels: f: food is good, s: service is excellent, p; price is high. Translate each of the following compound statements into symbolic notation.

    a) The food is good but the service is not excellent.

    b) The food is good and the service is excellent, but the price is high.

    c) Neither the food is good nor is the service excellent.

******

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): ¬, ∧, ∨, →]

   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: ΔABC is isosceles, q: ΔABC is equilateral and r: ΔABC 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 ΔBAC 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.

*****

1.
PDF -1

2.
PDF-2