CSC 303: Computer Architecture and organisation

Assignment instructions

- This is a group assignment: A group of 5 should be formed and be given a name of your choice. One team member's submission suffices the group
- Answer all questions: Solutions is to be submitted electronically on the google classroom platform & should not be more than 5 pages
- You are free to use any material to answer the questions
- Don't forget to add your ID Numbers
- If two groups submit similar assignment, both groups will get 0
- Active participation is compulsory for everyone

QUESTIONS

1. Discuss and differentiate between Hardwired control and Microprogrammed control?

2. Explain the concept of De Morgan's law and it uses in Boolean algebra

3. Explain the concept of pipelining in computer architecture and how it improves performance in processor design.

4. Combinational circuits
   a) Define combinational circuits and distinguish them from sequential circuit
   b) Mention and state the uses of the common types of combinational circuit

5. Flip-flops
   a) What do we mean by flip-flops in computer architecture?
   b) Mention and explain the four most common flip flops used

6. K-maps
   a) What are the rules for k-map simplification
   b) minimize the following equation using k-maps
      i) $F(A, B, C, D) = \Sigma m(0, 1, 3, 5, 7, 8, 9, 11, 13, 15)$
      ii) $F(A, B, C, D) = \Sigma m(0, 1, 2, 5, 7, 8, 9, 10, 13, 15)$

7. Convert the decimal numbers into binary and find the solutions in binary
   a) 55 / 5
   b) 50 - 7

8. with the aid of a truth table, determine if the 2 equations are equivalent

   A.

   $Z = \overline{A}B\overline{C}D + ABCD + A\overline{B}\overline{C}D + \overline{A}\overline{B}\overline{C}D + AB\overline{C}D + AB\overline{C}\,\overline{D}$

   $Z = \overline{C}D + AB\overline{C} + ABD$