

BINGHAM UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE
FACULTY OF SCIENCE AND TECHNOLOGY
FIRST SEMESTER EXAMINATION, 2021/2022 SESSION
COURSE CODE: CMP 301 **CREDIT UNITS: 3**
COURSE TITLE: COMPUTER ARCHITECTURE **TIME: 2.5 Hrs**

Instruction: Answer question one and any other three questions only

1. (a) Given a summarized function of a K-Map to be $F = B^1D^1 + A + C$ (where B^1 is B complement) from the K-Map, use the given function to:
 - i. Draw a K-Map with input in each of the cells that produce the function (5 marks)
 - ii. Draw and mark-out all possible groupings in the K-Map (5 marks)
 - iii. In Tabular form use the K-Map to generate the inputs for all possible variables and the original/initial function (i.e. function before summarization) of the Boolean expression (5 marks)
 - iv. Write out the terms that produced all ones in the K-map (5 marks)
 (b) What is K-Map? (1 mark) and Mention four (4) rules for grouping in K-Map (4 marks).

2. (a) Given a summarized function of a K-Map to be $F = BD + DC + A^1CD + ACD$ (where A^1 is A complement) from the K-Map, use the given function to:
 - i. Draw a K-Map with input in each of the cells that produce the function (3 marks)
 - ii. Draw and mark-out all possible groupings in the K-Map (3 marks)
 - iii. In Tabular form use the K-Map to generate the inputs for all possible variables and the original/initial function (i.e. function before summarization) of the Boolean expression (3 marks)
 - iv. Write out the terms that produced all ones in the K-map (3 marks)
 (b) What is Computer Bus? (1 marks), and list the three (3) types of computer bus (2 marks).

3. (a) Given a summarized function of a K-Map to be $F = D^1 + C + A^1B$ (where D^1 is D complement) from the K-Map, use the given function to:
 - i. Draw a K-Map with input in each of the cells that produce the function (3 marks)
 - ii. Draw and mark-out all possible groupings in the K-Map (3 marks)
 - iii. In Tabular form use the K-Map to generate the inputs for all possible variables and the original/initial function (i.e. function before summarization) of the Boolean expression (3 marks)
 - iv. Write out the terms that produced all ones in the K-map (3 marks)
 (b) Briefly explain the Fetch-Decode-Execute process between the Micro-Processor and Computer Memory (3 marks).

4. (a) Given a summarized function of a K-Map to be $F = BD + B^1D^1$ (where B^1 is B complement) from the K-Map, use the given function to:
 - i. Draw a K-Map with input in each of the cells that produce the function (3 marks)
 - ii. Draw and mark-out all possible groupings in the K-Map (3 marks)
 - iii. In Tabular form use the K-Map to generate the inputs for all possible variables and the original/initial function (i.e. function before summarization) of the Boolean expression (3 marks)
 - iv. Write out the terms that produced all ones in the K-map (3 marks)
 (b) What is Computer Architecture? (1 mark) and Mention two (2) benefits of studying Computer Architecture to Computer Scientists (3 marks).

final product

The Requirement Analysis phase

- Secure the system works, and is feasible but it just doesn't do what it is supposed to
- The requirement analysis - designer for the new system
- do the users need and want
- Statement

5. (a) Given a summarized function of a K-Map to be $F = A + C + D^1$ (where D^1 is D complement) from the K-Map, use the given function to:
- Draw a K-Map with input in each of the cells that produce the function (3 marks)
 - Draw and mark-out all possible groupings in the K-Map (3 marks)
 - In Tabular form use the K-Map to generate the inputs for all possible variables and the original/initial function (i.e. function before summarization) of the Boolean expression (3 marks)
 - Write out the terms that produced all ones in the K-map (3 marks)
- b. Mention advantage and disadvantage of using K-Map (3 marks).

Give Requirement analysis and functional Trace and compare

- Prioritize Requirements
- Update project

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FIRST SEMESTER EXAMINATION, 2019/2020 SESSION

COURSE CODE: CMP 301

CREDIT UNITS: 2

COURSE TITLE: COMPUTER ARCHITECTURE

TIME

ALLOWED: 2.5 HRS

INSTRUCTION: ANSWER ANY THREE QUESTIONS

1. (a) What is a logic circuit?
(b) Draw a logic gate diagram and the truth table for OR and XOR gates
(c) Given the Boolean expression $F(A,B,C,D) = \Sigma(2,3,5,6,8,9,10,11,12,13,14,15)$
(i) Draw a table showing the inputs and output of the expression
(ii) Draw the Karnaugh map for the Boolean expression
(iii) Simplify the Karnaugh map
(iv) Write out the result of the K-map simplification.
2. (a) What is a truth table?
(b) Draw a well labeled diagram of Von Neumann Machine Architecture
(c) Given the Boolean expression $F(A,B,C,D) = \Sigma(0,2,3,5,6,7,8,10,11,14,15)$
(i) Draw a table showing the inputs and output of the Boolean expression
(ii) Draw the Karnaugh map for the Boolean expression
(iii) Simplify the Karnaugh map
(iv) Write out the result of the K-map simplification.
3. (a) What is Computer architecture?
(b) Convert 111.101_{two} to Decimal number
(c) Given the Boolean expression $F(A,B,C,D) = \Sigma(0,1,2,3,4,6,8,9,10,11,12,14)$
(i) Draw a table showing the inputs and output of the Boolean expression
(ii) Draw the Karnaugh map for the Boolean expression
(iii) Simplify the Karnaugh map
(iv) Write out the result of the K-map simplification.
4. (a) What is a logic gate?
(b) Convert 19.6_{ten} to Binary number
(c) Given the Boolean expression $F(A,B,C,D) = \Sigma(3,4,5,7,9,13,14,15)$
(i) Draw a table showing the inputs and output of the Boolean expression
(ii) Draw the Karnaugh map for the Boolean expression
(iii) Simplify the Karnaugh map
(iv) Write out the result of the K-map simplification.