

**INTERNATIONAL SCHOOL OF MANAGEMENT AND TECHNOLOGY
GAIRIGAUN, TINKUNE, KATHMANDU
NEPAL**

BTEC HND in Computing

Unit 18: **Discrete math**

Unit Code: **Y/615/1648**

Session/Year: **Jun 2018**

Assessment No: **01**

Assignment Launch Date: **20 May 2019**

Due Date: **30 June 2019**

Assignment Title: **Central Bureau of Statistics**

Teacher Name: **Kamal Dhakal**

Iv's Name :

Student Name:

Pearson RegNo:

Final Grade:

Assignment submission format

Each student has to submit their assignment as guided in the assignment brief. The students are guided what sort of information is to produce to meet the criteria targeted. Prepare the assignment as guided below.

Scenario I

You have been working as a mathematical analyst for the Central Bureau of Statistics operating in Kathmandu Nepal. The Bureau helps the Nepal government with statistics in order to help in developing public policy planning, collecting and analyzing socioeconomic data and developing methodologies for reliable data collection and implementation is doing various researches on different technological aspects of the country.

With the use of data recorded from various sources, they are using mathematics to determine the fastest routes and time for travelling different corners of the city to free the general public from traffic congestion. With the help of minimum weighted spanning tree, they are trying to use the least amount of

pipelines to connect all the terminals of the locality. The Bureau is also determining the best possible ways to add streets to congested areas of cities uses graph theory.

For the storage of data and information, the bureau is using linear algebra for data compression and reduction of noise in data. All the data are stored as huge strings of 1's and 0's. For the automation of certain processes, Boolean algebra with various gates are used and simplified to reduce the complexity of circuits. You as a mathematical analyst are required to perform various tasks relating to discrete structure and perform necessary calculations and provide applicable solutions to the problems given to you.

Learning Outcomes covered

LO1: Examine set theory and functions applicable to software engineering.

LO2: Analyze mathematical structures of objects using graph theory.

LO3: Investigate solutions to problem situations using the application of Boolean algebra.

LO4: Explore applicable concepts within abstract algebra.

Part 1

With reference to the scenario, prepare a report which examines the set theory and functions applicable to software engineering and analyze mathematical structures of objects using graph theory.

Section 1

- Perform algebraic set operations in a formulated mathematical problem.
- Determine the cardinality of a given bag (multi set).
- Determine the inverse of a function using appropriate mathematical techniques.
- Formulate corresponding proof principles to prove properties about defined sets.

Section 2

- Model contextualized problems using trees, both quantitatively and qualitatively.
- Use Dijkstra's algorithm to find a shortest path spanning tree in a graph.
- Assess whether an Eulerian and Hamiltonian circuit exists in an undirected graph.
- Construct a proof of the Five Color Theorem.

Part 2

Prepare a technical booklet which investigates solutions to problem situations using the application of Boolean algebra and explore applicable concepts within abstract algebra.

Section 1

- Diagram a binary problem in the application of Boolean algebra.
- Produce a truth table and its corresponding Boolean equation from an applicable scenario
- Simplify a Boolean equation using algebraic methods and design a complex system using logic gates.
- Describe the distinguishing characteristics of different binary operations that are performed on the same set.
- Determine the order of a group and the order of subgroup in given examples.
- Validate whether a given set with a binary operation is indeed a group.

Section 2

- Prepare a presentation for twenty minutes that explains an application of group theory relevant to your course of study. And write a few paragraphs summarizing the key ideas or concepts you have presented.

Pass	Merit	Distinction
LO1: Examine set theory and functions applicable to software engineering.		
<p>P1 Perform algebraic set operations in a formulated mathematical problem.</p> <p>P2 Determine the cardinality of a given bag (multi set).</p>	<p>M1 Determine the inverse of a function using appropriate mathematical techniques.</p>	<p>D1 Formulate corresponding Proof principles to prove properties about defined sets..</p>
LO2: Analyze mathematical structures of objects using graph theory.		
<p>P3 Model contextualized problems using trees, both quantitatively and qualitatively.</p> <p>P4 Use Dijkstra's algorithm to find a shortest path spanning tree in a graph.</p>	<p>M2 Assess whether an Eulerian and Hamiltonian circuit exists in an undirected graph.</p>	<p>D2 Construct a proof of the Five Color Theorem.</p>
LO3: Investigate solutions to problem situations using the application of Boolean algebra.		
<p>P5 Diagram a binary problem in the application of Boolean Algebra.</p> <p>P6 Produce a truth table and its corresponding Boolean equation from An applicable scenario.</p>	<p>M3 Simplify a Boolean equation using algebraic methods.</p>	<p>D3 Design a complex system using logic gates.</p>
LO4: Explore applicable concepts within abstract algebra.		
<p>P7 Describe the distinguishing characteristics of different binary Operations that are performed on the same set.</p> <p>P8 Determine the order of a group and the order of a subgroup in given examples.</p>	<p>M4 Validate whether a given set with a binary operation is indeed group.</p>	<p>D4 Prepare a presentation that explains an application of group theory relevant to your course of study</p>

Mention all the grades awarded in this assignments:

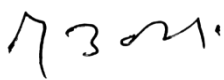
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Note: Please access HN Global for additional resources support and reading for this unit. For further guidance and support on report writing please refer to the Study Skills Unit on HN Global. Link to www.highernationals.com

Other Recommendations:

- ✓ It should be the student's own work – plagiarism is unacceptable.
- ✓ Clarity of expression and structure are important features.
- ✓ Your work should be submitted as a well presented, word-processed document with headers and footers, and headings and subheadings, both in hard and soft copies.
- ✓ You are expected to undertake research on this subject using books from the Library, and resources available on the Internet.
- ✓ Any sources of information should be listed as references at the end of your document and these sources should be referenced within the text of your document using Harvard referencing style
- ✓ Your report should be illustrated with screen-prints, images, tables, charts and/or graphics.
- ✓ All assignments must be typed in Times New Roman, size 12, 1½ spacing.

I declare that all the work submitted for this assignment is my own work or, in the case of group work, the work of myself and the other members of the group in which I worked, and that no part of it has been copied from any source. I understand that if any part of the work submitted for this assignment is found to be plagiarized, none of the work submitted will be allowed to count towards the assessment of the assignment.

Assignment Prepared By: Kamal Dhakal	Signature:	Date: 12thFeb 2019
Brief Checked By: Dhruba Babu Joshi	Signature: 	Date: 12thFeb 2019