Mathematics for Software Development

BSc (Hons) Computer Games Programming

School of Engineering, Arts, Science and Technology

Answer all of the following questions, showing all of your working. Use extra sheets of paper if required (graph or squared paper may be used).

Hand out on Monday 28th October 2019

**To be completed by 09:00 Monday 4th November 2019**

Student ID …………………………………..

This problem set has 8 questions, for a total of 100 points.

**ASSESSMENT**

The majority of the summative assessment takes the form of regular problem sets assigned to students to be completed within a reasonable time frame, formative feedback will be available to them during tutorial sessions and workshops.

These problem sets will reinforce topics discussed in lectures and lead into a final exam of three hours, requiring students to answer a series of questions and provide their workings to demonstrate their understanding of the concepts underlying the questions being asked of them.

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| **Component Number** | **Form of assessment** | **Assessment size** | **Weighting (%)** | **Learning Outcomes assessed** |
| 1 | Problem Sets | 8 sets | 80% | 1, 2, 3 |
| 2 | Exam | 3 hours | 20% | 1, 2, 3 |

**ASSESSMENT CRITERIA**

1. Attempted to solve mathematical problems, making use of the correct underlying theories.
2. Submitted a series of solutions to assigned problem sets.
3. Produced solutions to problems, explaining their workings for each problem clearly and concisely.

This problem set has 8 questions, for a total of 100 points.

Marks Awarded:

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| **Question** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **Total** |
| **Marks Available** | **10** | **15** | **10** | **15** | **10** | **10** | **15** | **15** | **100** |
| **Score** |  |  |  |  |  |  |  |  |  |

Question 1

Which of the following are propositions? Answer in the space provided. [2 points each part]

1. June is in the summer in the Southern Hemisphere.

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1. Kick me.

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1. Is the sky pink?

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1. x is less than y.

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1. Zero is an Integer.

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Points awarded: \_\_\_\_\_\_\_\_\_ out of a possible 10.

Question 2

Translate the following compound propositions into natural English, answer in the space provided: [3 points each part]

*P*: "The printer has ink"

*Q*: "There is some paper for the printer"

*R*: "The text has been printed



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Points awarded: \_\_\_\_\_\_\_\_\_ out of a possible 15.

Question 3

Translate the following English statements into compound propositions. Answer in the space provided: [2 points each part]

Let A = “The car is electric” and B = “The car produces exhaust fumes”

1. “The car produces no exhaust fumes”

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1. “The car is electric or the car produces exhaust fumes”

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1. “If the car is electric then it does not produces exhaust fumes”

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1. “Either the car is electric and it does not produces exhaust fumes, or it is not electric”

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1. “The car is electric, or if the car isn’t electric then it produces exhaust fumes”

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Points awarded: \_\_\_\_\_\_\_\_\_ out of a possible 10.

Question 4

Construct Truth Tables for the following, answer in the space provided.

1. [6 points]

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1. [9 points]

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Points awarded: \_\_\_\_\_\_\_\_\_ out of a possible 15.

Question 5

Construct a Truth Table for the following, answer in the space provided.

1. [5 points]

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1. Show that this is equivalent to [5 points]

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Points awarded: \_\_\_\_\_\_\_\_\_ out of a possible 10.

Question 6

Construct a Truth Table, in the space provided, to show that the following is true. [10 points]

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Points awarded: \_\_\_\_\_\_\_\_\_ out of a possible 10.

Question 7

Consider the following propositions

H = “I go to Harry’s”

C = “I go to the country”

S = “I will go shopping”.

Translate the following statement into a compound proposition and construct a logic table to determine its validity. [15 points]

*If I go to Harry’s or to the country, I will not go shopping.*

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Points awarded: \_\_\_\_\_\_\_\_\_ out of a possible 15.

Question 8

Consider the following statement

“If Peter does not pass his driving test, then he will not be able to drive to work and will have to get the bus”.

Convert the statement into symbolic form clearly stating any propositions, then generate its truth table. [15 points]

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Points awarded: \_\_\_\_\_\_\_\_\_ out of a possible 15.