School of Electrical Engineering & Computing
University of Newcastle
COMP1010 –Computing Fundamentals

Workshop Week 11

Why are you making me do maths ?

1. Take YouTube as an example of a software application. Provide an example where you imagine there is a process inside of the YouTube application which implements concepts relating to:

    a) Set Theory
    b) Graph Theory
    c) Conditional Statements

2. Imagine a system that is built to manage student enrolements. Provide an example where you imagine there is a process inside of this application which implements concepts relating to:

    a) Set Theory
    b) Graph Theory
    c) Conditional Statements

Variables

3. There are many different ways to write the same statement. Take the following for example

    Every positive number has a positive square root.

    Using the examples giving in the lecture, re-write this statement by filling in the gaps below. Ensure that all statements are equivalent.

a) All positive numbers _____.

b) For any positive number e, there is _____ for e.

c) For all positive numbers e, there is a positive number r such that _____

Set Theory

4. Which of the following sets are equal?

   $A = \{a,b,c,d\}$ $B = \{d,e,a,c\}$

   $C = \{d,b,a,c\}$ $D = \{a,a,d,e,c,e\}$

5. Answer the following yes/no questions

   a) Is $\{2\} \in \{1,2\}$
   b) Is $\{3\} \in \{1,\{2\},\{3\}\}$?
   c) Is $1 \in \{1\}$?
   d) Is $\{1\} \subseteq \{1,2\}$?
   e) Is $1 \in \{\{1\},2\}$?
   f) Is $\{1\} \subseteq \{1\}$?

6. Let S = {2, 4, 6} and T = {1, 3, 5}.

   Use the set-roster notation to write each of the following sets, and indicate the number of elements that are in each set:

   a) S x T
   b) T x S
   c) S x S
   d) T x T

7. Answer true/false for the following statements

   a) Is (5,−5) = (−5,5)?
   b) Is (-2/-4, $(-2)^3$) = (3/6, -8) ?

Statements (5 minutes)

8. Explain the different between a universal statement, a conditional statement and an existential statement.

9. For the statement “All positive numbers are greater than zero”, is this statement a

   a) Universal statement
   b) Conditional statement
   c) Existential statement