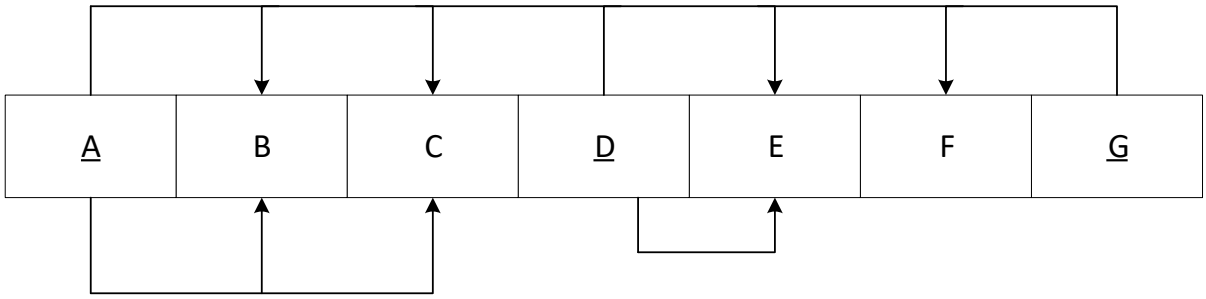
INFO151 2018-T1
Assignment 4 (20%)

1. Examine the dependency diagram carefully and answer the questions below.



(a) Identify the primary key of the above dependency diagram. What is the name given to this type of primary key? [2 marks]
(b) What type of dependency is D→E and A→B,C? [2 marks]
(c) Can (A,D,G) determine F in the above diagram? Justify your answer. [2 marks]
(d) Name two key attributes other than "A". [2 marks]
(e) Normalise the above dependency table to 3rd normal form. You must show the progress from 1NF to 2NF, and then to 3NF. Indicate all the primary keys and foreign keys in the normalised tables. [8 marks]
(f) Write the DDL to create the final 3NF tables. For primary keys use 'Integer' data type, and for non-key attributes use 'Text' data type. Use TABLE1, TABLE2, and TABLE3 etc. for the table name. [4 marks]

2. Given the constraint that a student can only register for ONE degree programme, answer the questions below.

Student Record Form

Student ID:	12345678
Name:	James Bond
Address:	10 Downing Street, Wellington
Email:	jamesbond@gmail.com
Degree:	Bachelor of Computer Science

Course Summary:

Code	Year	Course Name	Grade
INFO101	2013	Fundamentals of IS	F
FCOM100	2013	NZ Business Enviro	C
ELCM222	2015	E-business Strategy	B+
INFO101	2014	Fundamentals of IS	A
ELCM203	2014	Internet Apps	C

(a) From the student record form above, identify the attributes likely to form a repeated group. [2 marks]
(b) Transform the form into a table, then identify and write the primary key for the table. [4 marks]
(c) Draw all the dependencies and identify the type of dependency for the 1NF table. [6 marks]
(d) Normalise the 1NF table into 3rd normal form. You must show the progress from 1NF to 2NF, and then to 3NF. [8 marks]
(e) Indicate all the primary keys and foreign keys in the normalised tables. [4 marks]
(f) Write the DDL to create the normalised tables in a correct sequence. Use the table names StudentInfo, GradeInfo, and CourseInfo to represent the normalised tables. [6 marks]
(g) Write the INSERT SQL in a correct sequence to insert all the data shown in the sample form into the appropriate tables. [4 marks]
(h) Write the SQL to find the total number of 'F' grade for each student. The output should display Name, Student ID, and the "Total number of F Grade". Use the table names provided in (f). Use only the "JOIN ON" method for joining tables. [4 marks]
(i) If the course name is possible to change after each year but not the course code, show the new 'CourseInfo' dependency diagram. [2 marks]

3. A table to record the project accounts of employee is given below:

PROJ_ID	PROJ_NAME	EMP_ID	EMP_NAME	JOB_TYPE	HOUR_RATE

Assumptions: A project can have many employees. An employee can work in many projects. EMP_ID is unique to an employee. PROJ_ID is unique to a project. Each employee has one job type. The same hourly rate is charged for the same job type.

(a) Explain clearly with examples why the above table is not a good database solution with respect to insert, delete and update anomalies. [6 marks]
(b) Identity the primary key for the above table (use this type of representation, Primary Key (A, B)). [2 marks]
(c) Identify the Transitive dependency in the above table (use this type of representation, A→B). [2 marks]
(d) Provide a normalised 3NF solution. You must show the progress from 1NF to 2NF, and then to 3NF. Indicate all the primary keys and foreign keys in the normalised tables. [10 marks]

Submission Instructions:

(1) Submit your assignment as a PDF file only (to avoid misalignment in diagrams).
(2) Use VISIO or other software to draw diagrams, hand drawn diagram will NOT be accepted.
(3) For each question you must clearly indicate the answer for each part, any part that is missing will receive 0 marks.
(4) Any diagrams and representation method that are not the same as those taught in workshop and lecture will receive 0 marks.