



**KENYATTA UNIVERSITY**  
**DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY**  
**SIT 211: LOGIC PROGRAMMING**  
**ASSIGNMENT III**

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**Submission Instructions:**

**Deadline:** 19<sup>th</sup> February, 2020 11h00.

**Submission Type:** Hand-written Solution and a Prolog Implementation.

**1.** Use the below program to attempt the following questions:

mother(ann,henry).

mother(ann,mary).

mother(jane,mark).

mother(jane,francis).

mother(annette,jonathan).

mother(mary,bill).

mother(janice,louise).

mother(lucy,janet).

mother(louise,caroline).

mother(caroline,david).

mother(caroline,janet).

father(henry,jonathan).

father(john,mary).

father(francis,william).

father(francis,louise).

father(john,mark).

father(gavin,lucy).

father(john,francis).

parent(victoria,george).

parent(victoria,edward).

parent(X,Y):-mother(X,Y).

parent(X,Y):-father(X,Y).

parent(elizabeth,charles).

parent(elizabeth,andrew).

ancestor(X,Y):-parent(X,Y).

ancestor(X,Y):-parent(X,Z),ancestor(Z,Y).

**a)** Extend the program above by devising rules to define each of the following:

**i)** child\_of(A,B) [2 Marks]

**ii)** grandfather\_of(A,B) [3 Marks]

**iii)** grandmother\_of(A,B) [3 Marks]

**iv)** great\_grandfather\_of(A,B) [3 Marks]

**b)** Provide the outputs of each of the following queries and for each of them explain/illustrate the unification and backtracking process that leads to the outputs.

**i)** ?-grandfather(X,Y). [10 Marks]

**ii)** ?- grandparent(john,Y). [10 Marks]

**iii)** ?- grandparent(X,Y). [15 Marks]