Question One:

a. Give two different definitions for Artificial Intelligence (A.I.), explaining the differences between them.
b. In A.I. what do you understand by the term “Agent”.
c. Write the following sentence as Prolog style Horn clause:

“All dogs are mammals”.
Question Two:

a) With the aid of the simple binary tree below, find the path used in
   1. Breadth First Search, and
   2. Depth First Search,
      explaining the differences between both searches.

b) Concisely explain how Greedy Best First Search works
Question Three:

1. Using Truth Tables only prove that:
   a. \( \neg(\alpha \land \beta) \equiv (\neg\alpha \lor \neg\beta) \)
   b. \( (\alpha \leftrightarrow \beta) \equiv ((\alpha \Rightarrow \beta) \land (\beta \Rightarrow \alpha)) \)

3. Rewrite the following sentence in logic using two different ways, one using the \( \forall \) symbol, and the other using the \( \exists \) symbol:
   “Everyone likes IceCream”.

Question Four:

1. Rewrite the following sentences using First Order Logic:
   a) all dogs are mammals.
   b) Fido is a dog
   c) Fido is a mammal

2. State the Modus Ponens rule of deduction, and use it to deduce sentence (c) from sentences (a) and (b) above.

3. In a heuristic search in problem solving, what is a heuristic function?
Question Five:

a. In a Genetic Algorithms problem, two individuals were chosen to be:

   111100 and 001111

   and the crossover point was chosen to be in the middle of each of the chromosomes, what would the resulting new individuals be?

b. with the aid of diagrams explain the difference between **Point cross over**, and **Two Point cross over**.