Question 5: (15 marks)

You are given a knowledge based system with the following knowledge base,

Knowledge/Fact Base:
```
LChild(David, John)        RChild(Diana, John)
LChild(Tom,   Diana)       RChild(Ruby,  Diana)
RChild(Mary,  David)       LChild(Bill,  Mary)
RChild(Peter, Tom)         RChild(Fish,  Ruby)
```

     where **LChild(X,Y)** means "X is *left child* of Y" and
            RChild(X,Y) means "X is *right child* of Y".

Inference Rules:
```
R1.   Child(X,Y) if LChild(X,Y)
R2.   Child(X,Y) if RChild(X,Y)
```

(a) (3 marks) Draw a "family tree" based on the fact base given. (In the "family tree", the "child" is drawn *below* the "parent" with arrow from parent to child.)

(b) (3 marks) Answer the following queries: (no need to show the steps)

    `?LChild(Mary, David)`   **Answer:** _____

    `?RChild(X, Diana)`   **X =** _____

    `?Child (Y, John)`   **Y =** _____

(c) (2 marks) Give inference rule(s) for the **Descendant** relationship where **Descendant(X,Y)** means "X is *descendant* of Y" and

    R3:   **Descendant(X,Y)** if

(d) (3 marks) Answer the following query: (no need to show the steps)

    `?Descendant(Peter, Tom)`   **Answer:** _____

    `?Descendant(W,David)`   **W =** _____

    `?Descendant(Fish,Z)`   **Z =** _____