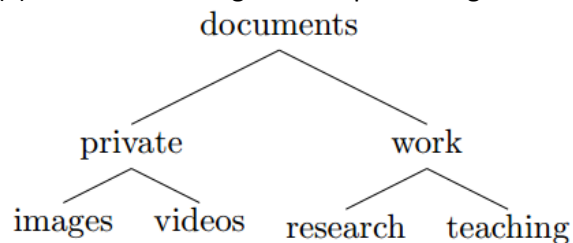


## PROLOG EXERCISE 1

1. Given the following genealogical fact database, in which `parent(X,Y)` means X is a parent of Y :

```
parent(john,sarah).
parent(john,jim).
parent(mary,sarah).
parent(mary,jim).
parent(sarah,betty).
parent(dave,betty).
parent(jim,jill).
parent(jim,susan).
parent(kate,jill).
parent(kate,susan).
female(sarah).
female(mary).
female(betty).
female(jill).
female(kate).
female(susan).
male(john).
male(jim).
male(dave).
```

- a) write a predicate `grandfather(X,Y)` that is true if X is a grandfather of Y.  
b) write a predicate `aunt(X,Y)` that is true if X is an aunt of Y.
2. (a) Write a knowledge base representing the following directory tree:



(Keyword for predicate '*subdir*')

- (b) Add rules 'descendants' to retrieve descendant nodes.
3. Given the knowledge base below :

```
follows(anne,fred).
follows(fred,julie).
follows(fred,susan).
follows(john,fred).
follows(julie,fred).
follows(susan,john).
```

```
follows(susan,julie).
tweets(anne,tweet1).
tweets(anne,tweet5).
tweets(fred,tweet2).
tweets(fred,tweet7).
tweets(fred,tweet8).
tweets(john,tweet3).
tweets(john,tweet4).
tweets(julie,tweet6).
tweets(susan,tweet9).
tweets(susan,tweet10).
```

- (a) Add rules 'friends' to find person who are friend (i.e follow each other).
- (b) Add rules 'freed\_sees' to find tweet which can Freed see (assuming the only direct followers will see at tweet).