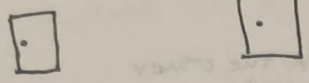
Assignment 7

Question 1

Tea Party Rabbit Hole two cats: Yes (1) / No (0)



1. Cat one always tells the truth → Tautology

   Cat two always tells a lie → Contradiction

   · if cat one asked first it tells "yes" as it tells the truth

   · if cat two is asked it tells "yes" as it always lies

2. "If I ask the other cat whether he is the liar, what will be his answer?"

   if cat one is asked (which always tells the truth)

   ↳ "He is not our liar" cat one would respond with "I am not a liar" as cat two always lies and respond with

   if cat two is asked (which always tells the lie)

   ↳ "I am a liar" as cat one never lies

   let simplify

   both the cats would predict what their twin brother would say accurately and given opposite results

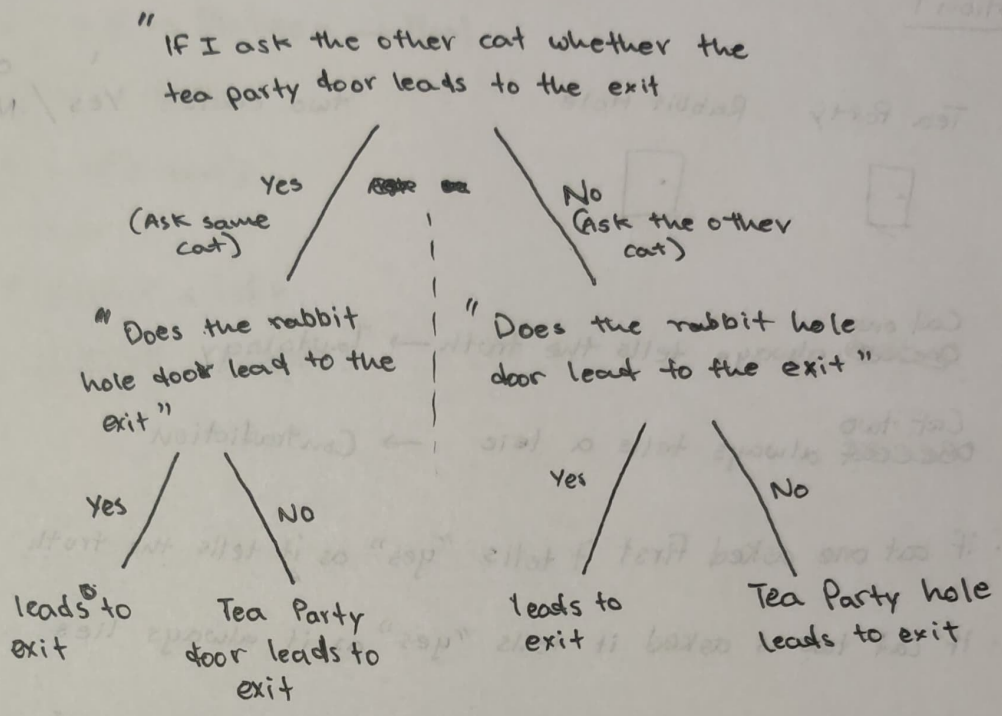
2. Truth cat:

- Will answer "yes" because it knows it's twin brother always lies
- Thus the truth cat knows this and answers "no" as it knows its twin will say "yes"

Lying Cat:

- Will answer "no" because it knows it's twin brother always tells the truth
- Thus the lying cat knows this and answers "yes" as it knows its twin will say "no"

3. 1st Question: (For any cat)



Question 2

```
data BinTree a = EmptyTree | Node a (BinTree a) (BinTree a)
    deriving(Show)

insertTree :: (Ord a) => a -> BinTree a -> BinTree a
insertTree x EmptyTree = Node x (EmptyTree) (EmptyTree)
insertTree x (Node y left right)
    | x == y = Node x left right
    | x < y  = Node x (insertTree x left) right
    | x > y  = Node x left (insertTree x right)
```

Continuation in next page:

Question 2

```
findBST :: (Ord a) => a -> BinTree a -> Bool

findBst x EmptyTree = False

findBST x (Node y left right)
    | x == y = True
    | x < y  = findBST x left
    | x > y  = findBST x right
```