

# CIS 572 Assignment 1

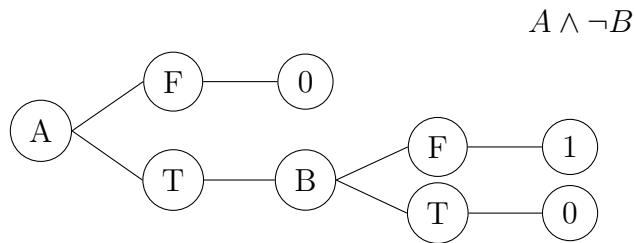
Steven Walton

April 6, 2019

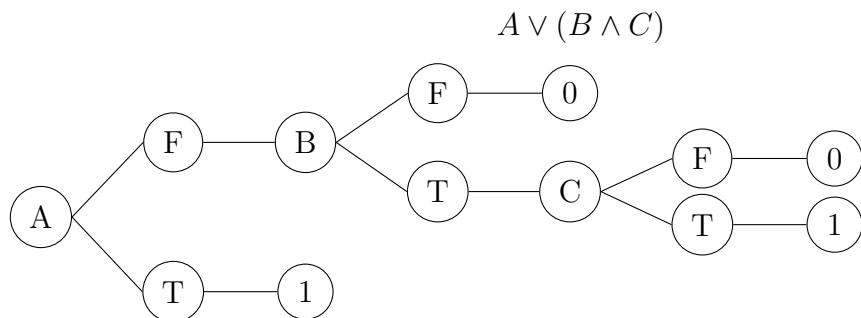
## Problem 1

Answer Exercise 3.1 from Chapter 3 of Mitchell's machine learning book.

### Part a)

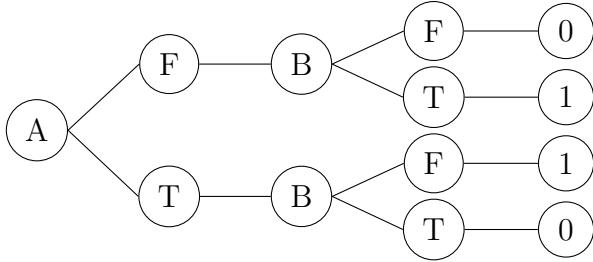


### Part b)

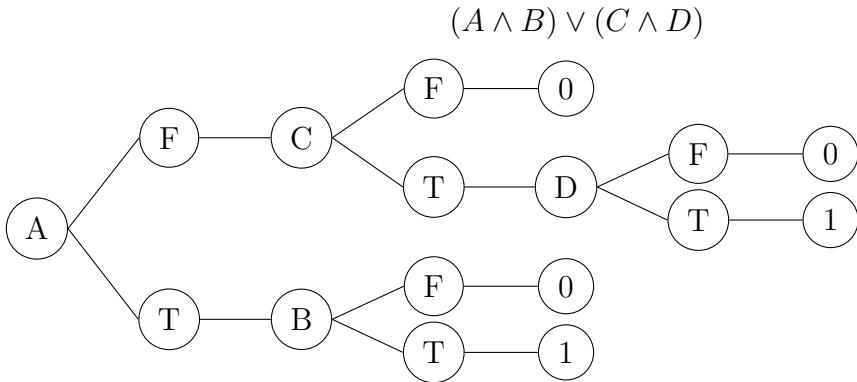


### Part c)

$$A \text{ XOR } B$$



**Part d)**



## Problem 2

Consider the samples in the Play-tennis dataset from Table 3.2 in Mitchell's textbook. If you calculate the information-gain for all of the attributes of this set, you will observe that the attribute "Outlook" has the largest information- gain, which is equal to 0.246. Therefore, the attribute "Outlook" is the best heuristic choice for the root node.

- (a) List the labels of the new tree branches below the root node.
- (b) Which partition of the data will be assigned to each branch by ID3? Please list the sample IDs that will be assigned to each branch.
- (c) Calculate the information gain for the remaining attributes in each branch, and determine which attribute will be chosen as the root of the sub-tree in each branch.

**Part a)**

**Part b)**

**Part c)**