**502571-3 2nd Trimester 2022/2023 HW#3**

# Topics: Decision Tree Sections: 2233 & 3827

# Due Date: Sunday 05/02/2023 – 11:59 pm

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**Exercise 1:**

In the following example, we have three attributes: pain, fever, and cough and, we have five classes.

|  |  |  |  |
| --- | --- | --- | --- |
| **Fever** | **Pain** | **Cough** | **Class** |
| Yes | Abdomen | No | Appendicitis |
| No | Abdomen | Yes | Appendicitis |
| Yes | Throat | No | Cold |
| Yes | Throat | Yes | Cold |
| No | Throat | Yes | Sore throat |
| Yes | No | Non | No disease |
| Yes | No | Yes | Cold |
| No | No | Yes | Chill |
| No | No | No | No disease |

Draw the related decision tree

**Diagram

Description automatically generated**

**Exercise 2:**

The following decision tree has been created for loan approval.

Diagram

Description automatically generated

1. Convert this tree to if then rules (decision rules):

1- if income range of applicant < $30k AND Criminal record == yes then class = 'loan'

2- if income range of applicant < $30k AND Criminal record == No then class = 'no loan'

3- if income range of applicant > $70k AND Criminal record == yes then class = 'no loan'

4- if income range of applicant > $70k AND Criminal record == no the class = 'loan'

5- if income range of applicant between $30k AND $70k AND Years in present job < 1 the class = 'no loan'

6- if income range of applicant between $30k AND $70k AND Years in present job > 5 the class = 'loan'

7- if income range of applicant between $30k AND $70k AND Years in present job between 1 AND 5 AND Makes credit card payments == Yes then class = "loan"

8- if income range of applicant between $30k AND $70k AND Years in present job between 1 AND 5 AND Makes credit card payments == No then class = "no loan"

1. Using the decision tree above, predict the class of each record

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Income range of applicant** | **Criminal record** | **Years in present job** | **Makes credit card payments** | **Class** | **Prediction** |
| 1 | $25K | no | 6 | no | loan | No loan |
| 2 | $40K | yes | 2 | yes | loan | loan |
| 3 | $80K | no | 7 | yes | No loan | loan |
| 4 | $55K | no | 8 | no | No loan | loan |