**Decision Tree**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| instance | **a1** | **a2** | **a3** | **class** |
| 1 | T | T | 10 | C1 |
| 2 | T | T | 60 | C1 |
| 3 | T | F | 50 | C0 |
| 4 | F | F | 40 | C1 |
| 5 | F | T | 70 | C0 |
| 6 | F | T | 30 | C0 |
| 7 | F | F | 80 | C0 |
| 8 | T | F | 70 | C1 |
| 9 | F | T | 50 | C0 |
| 10 | T | F | 80 | C1 |

**(Q1)** What is the initial **Entropy** of this collection of training examples?

**(Q2)** What is the initial **Gini index** of this collection of training examples?

**(Q3)** What is the initial **Classification error** of this collection of training examples?

**(Q4)** What is the better split (between **a1** and **a2**) according to the **Gain of Entropy**?

**(Q5)** What is the better split (between **a1** and **a2**) according to the **Gain of Gini index**?

**(Q6)** What is the better split (between **a1** and **a2**) according to the **Gain of Classification Error rate**?

**(Q7)** For **a3**, which is a continuous attribute, compute the **Gain of Entropy** for every possible split.