

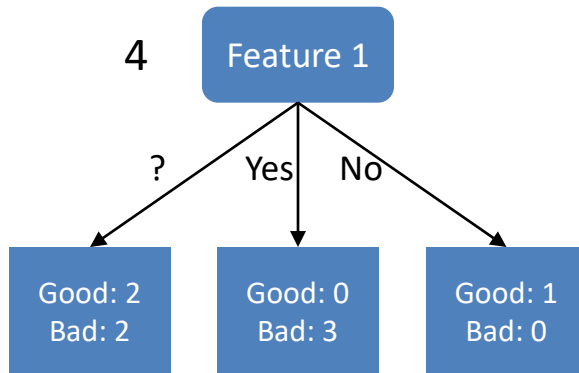


Decision Tree

Prof. Seungchul Lee
Industrial AI Lab.

Feature Test

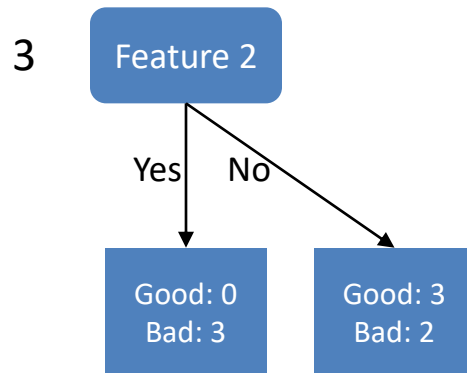
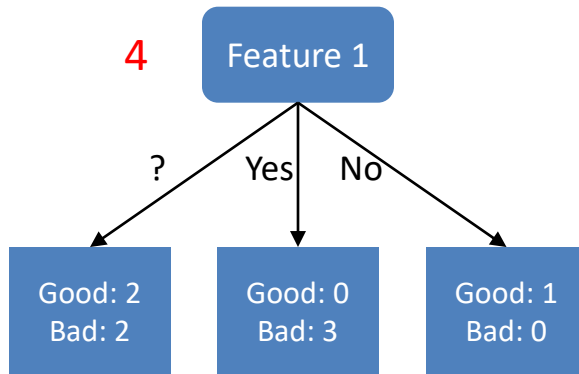
- Feature test in the first level



Feature 1	Feature 2	Feature 3	Feature 4	output
?	Yes	Low	Medium	Bad
Yes	Yes	High	Medium	Bad
?	No	High	Medium	Good
No	No	Medium	High	Good
?	No	Medium	Low	Good
Yes	No	Low	High	Bad
Yes	No	Medium	High	Bad
?	Yes	High	Low	Bad

Feature Test

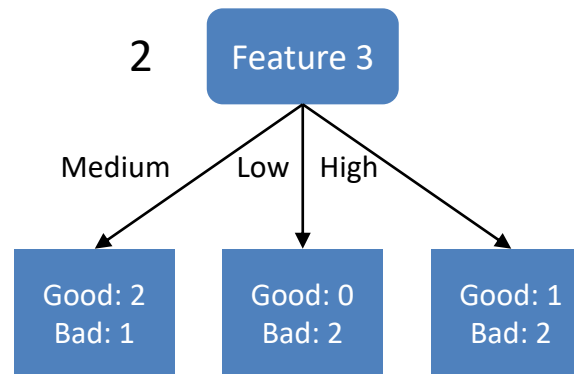
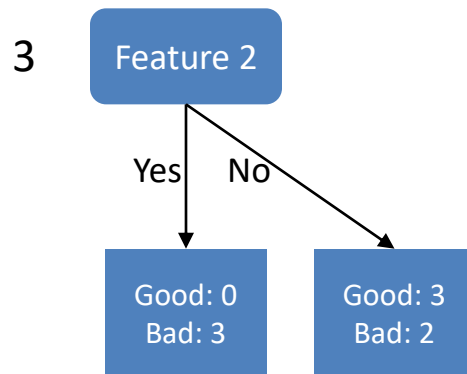
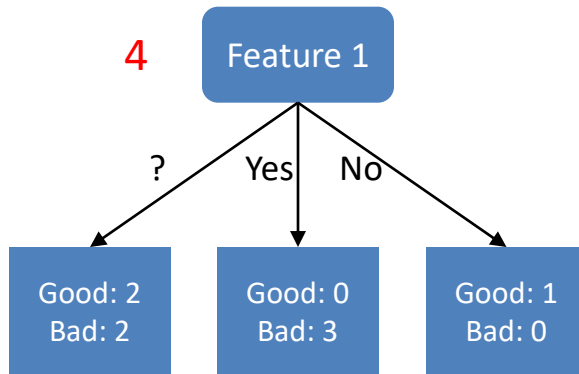
- Homogeneous set in the first level



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Feature Test

- Homogeneous set in the first level

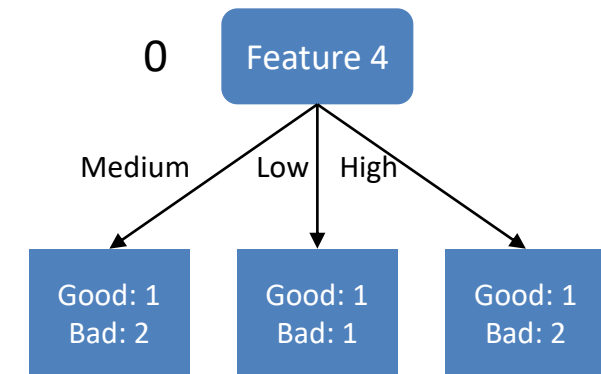
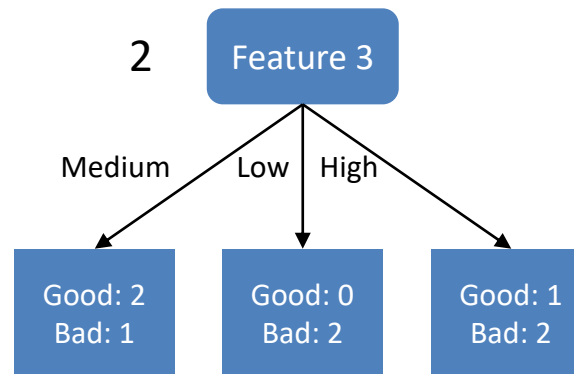
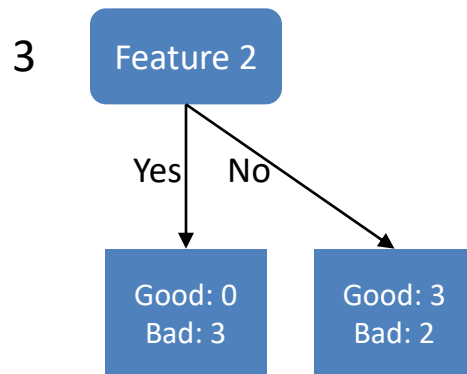
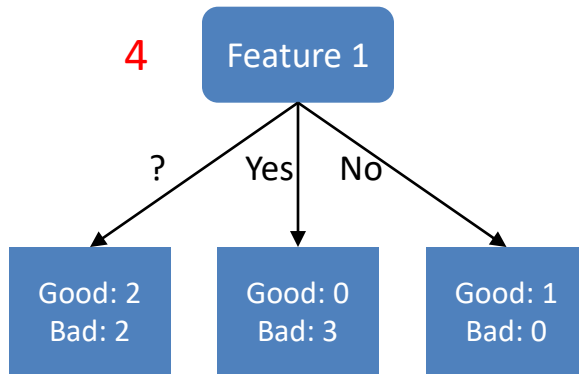


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Feature Test

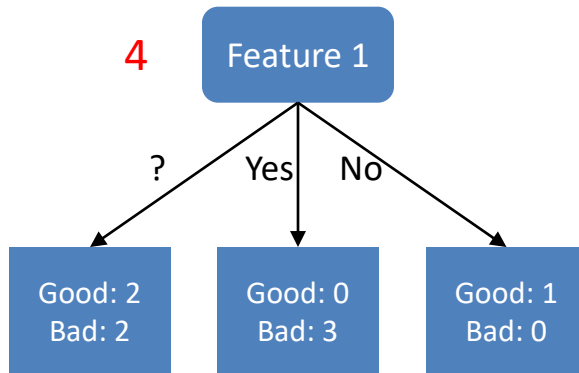
- Homogeneous set in the first level

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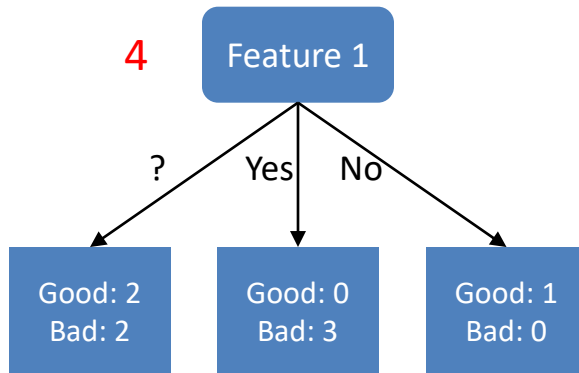
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Feature Test

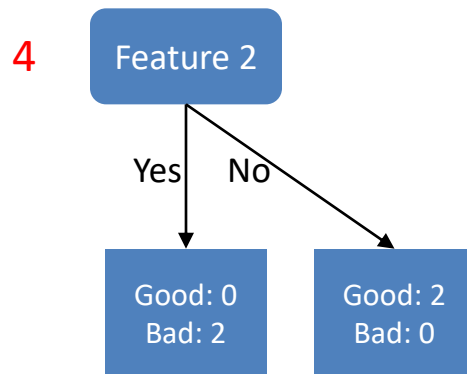
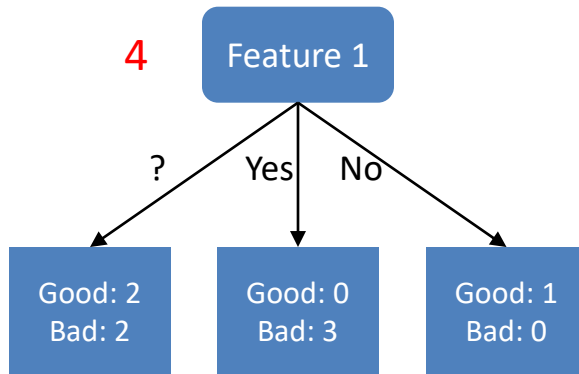
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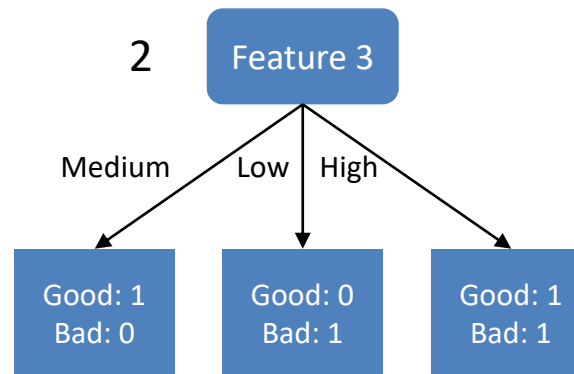
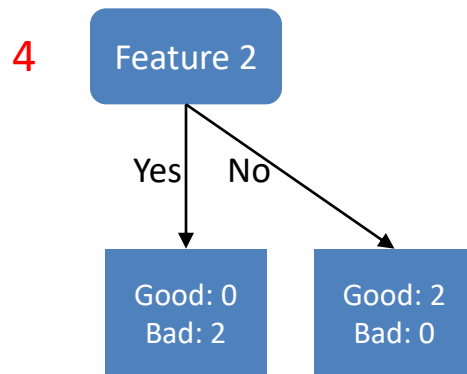
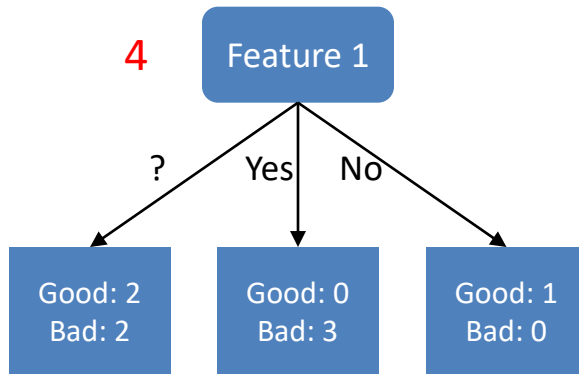
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Feature Test

- Homogeneous set in the second level

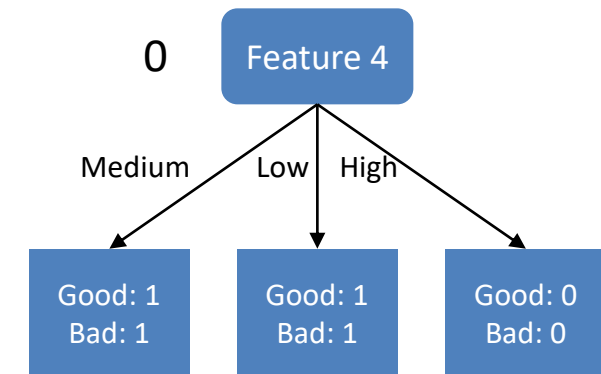
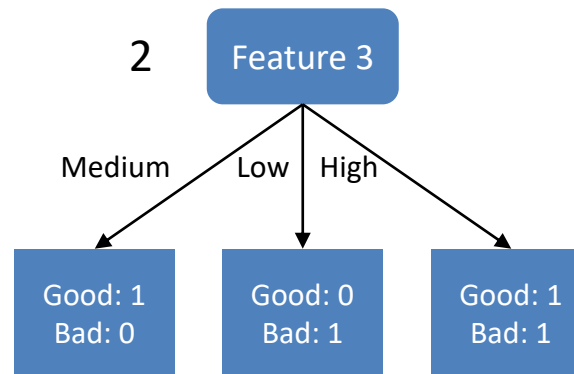
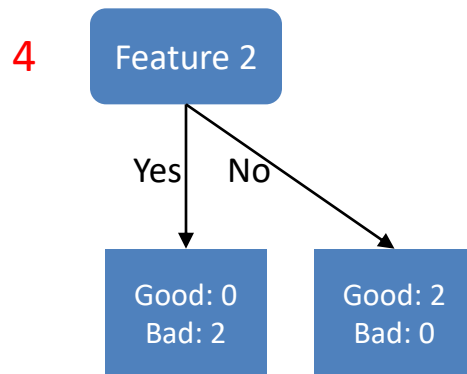
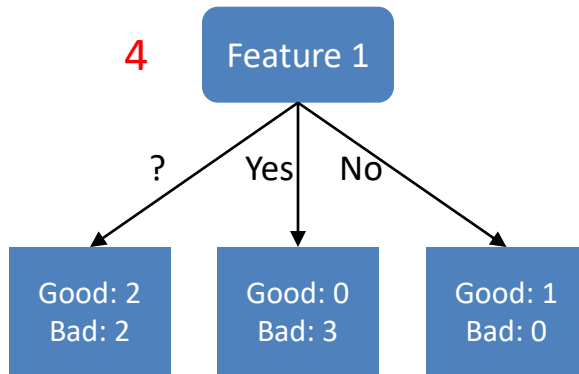


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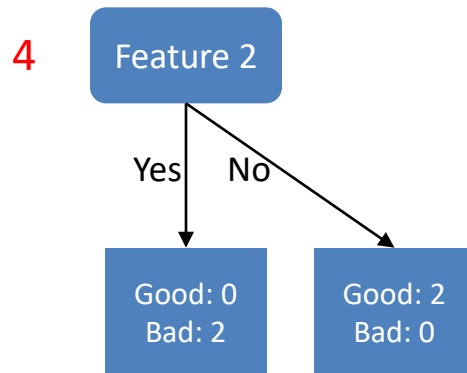
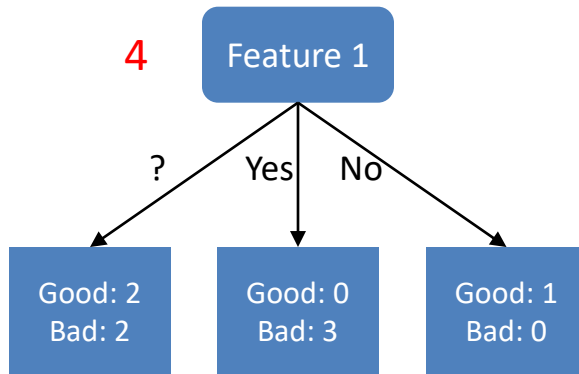
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Feature Test

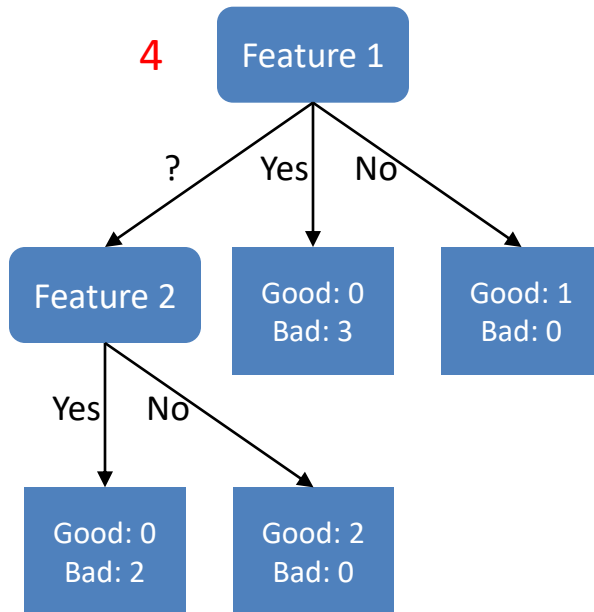
- Homogeneous set in the second level



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Feature Test

- Decision tree



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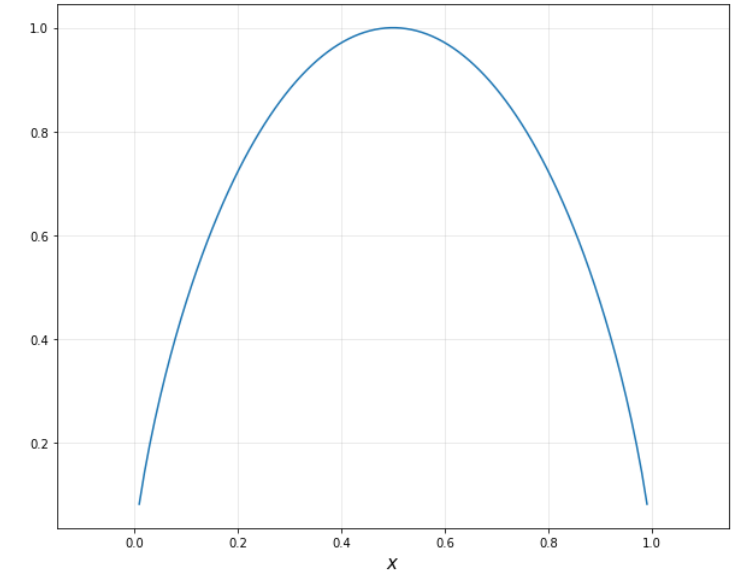
- Issue: a large data set will be most likely to produce zero homogeneous set

Disorder

- Disorder of single set

$$D = -x \log_2 x - (1 - x) \log_2 (1 - x)$$

$$D = -\frac{G}{T} \log_2 \frac{G}{T} - \frac{B}{T} \log_2 \frac{B}{T}$$



Quality of Test

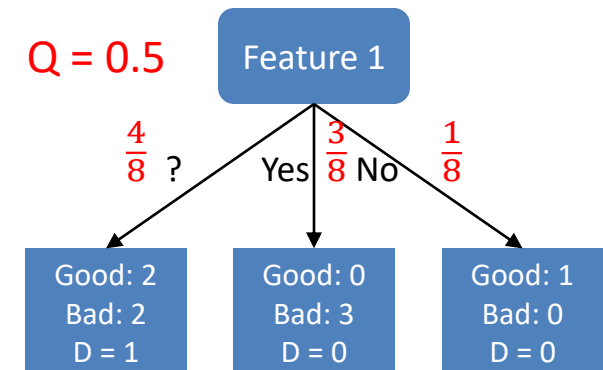
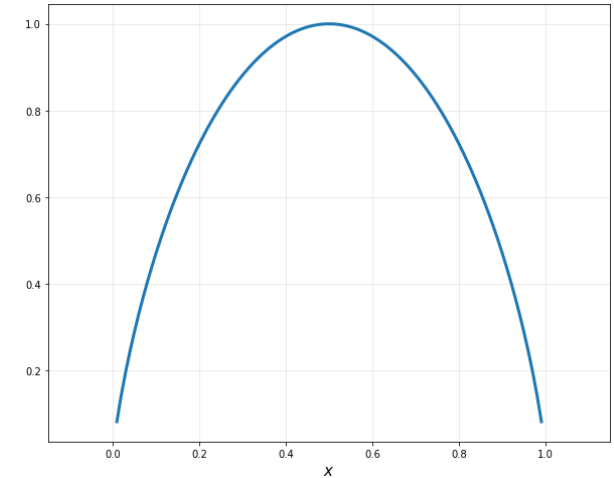
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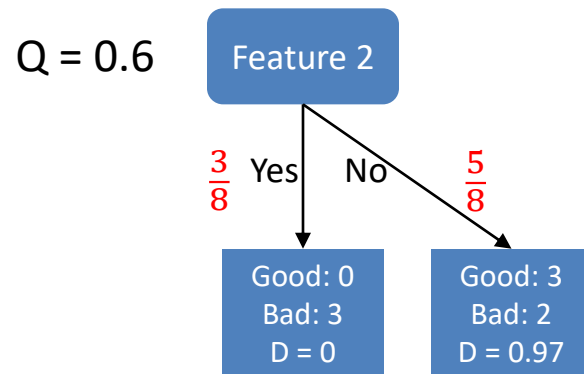
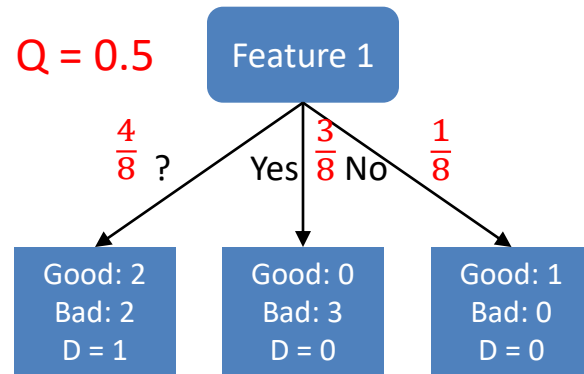
- Quality of test

$$Q(\text{test}) = \sum D(\text{set}) \times \frac{\# \text{ of samples in set}}{\# \text{ of samples in all sets}}$$



Quality

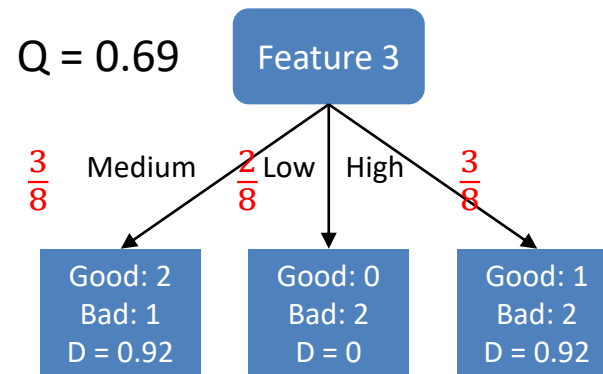
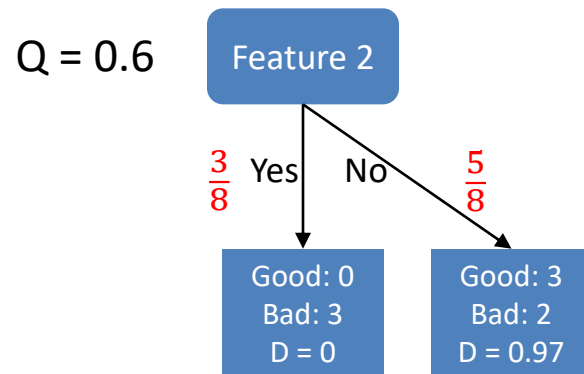
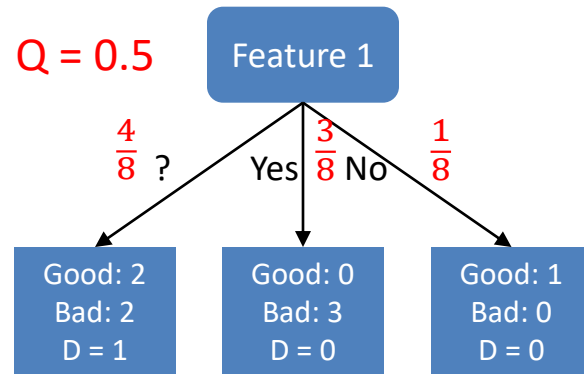
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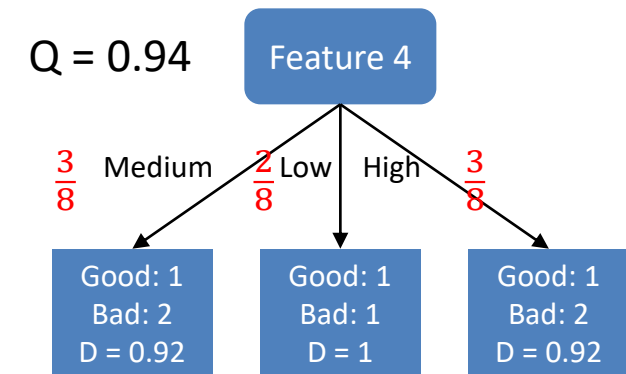
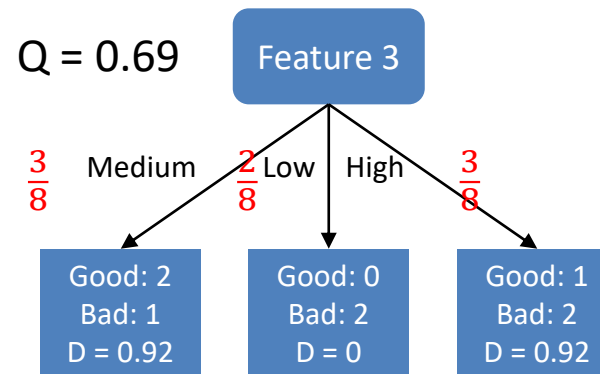
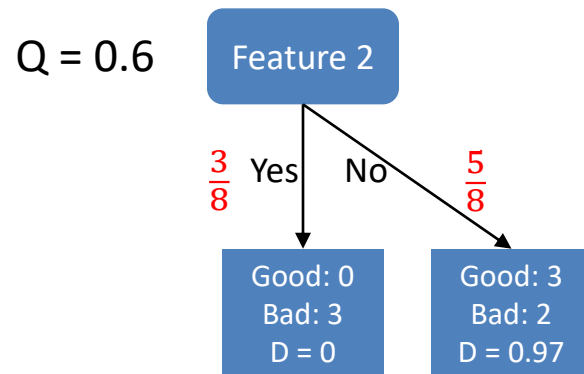
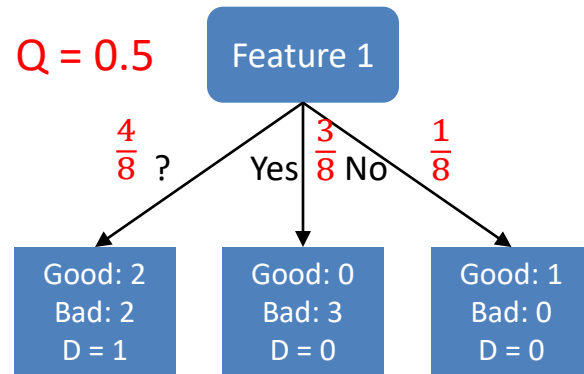


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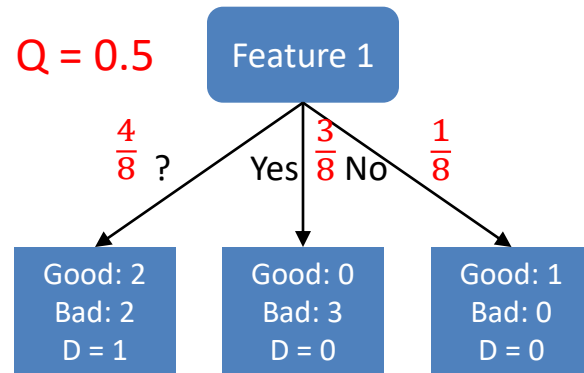
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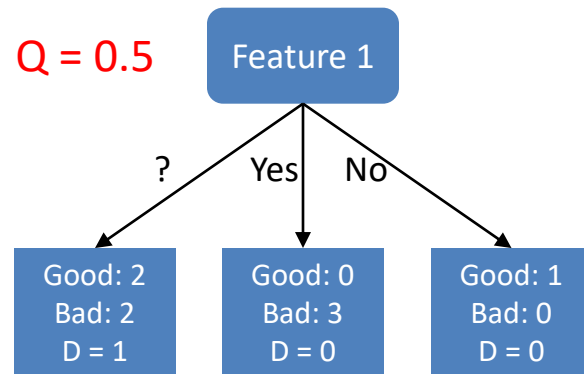
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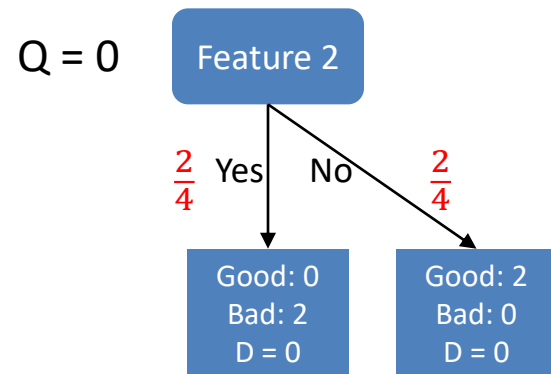
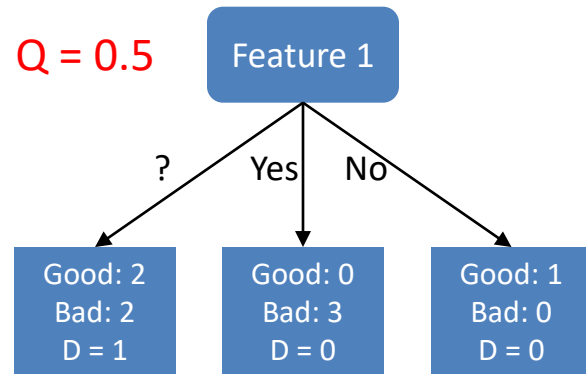
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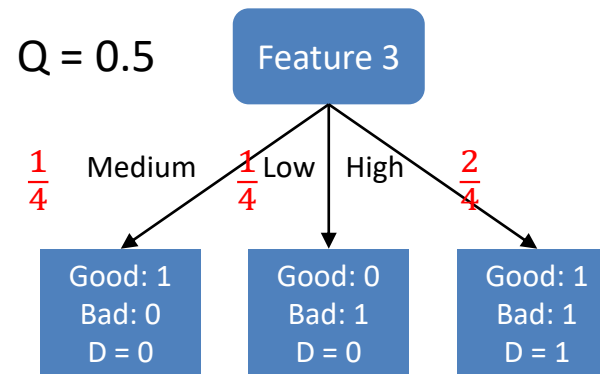
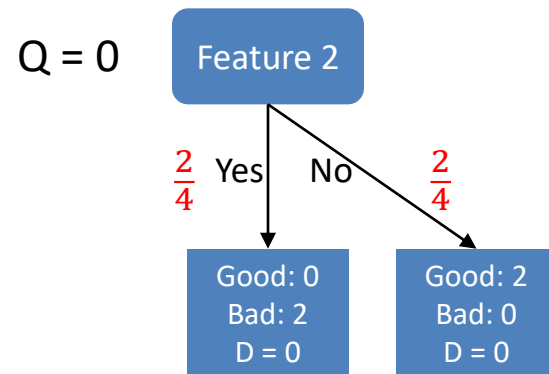
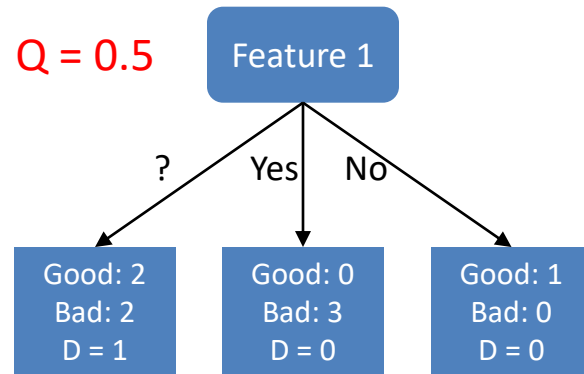
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