Part 1

For each dataset, rank the following algorithms by the performance you expect, under 2-fold cross-validation, and give an explanation.

A. FLD

B. SFS (to 2 dimensions) + FLD

C. SBS (2) + FLD

D. PCA (1) + FLD

Each dataset will be constructed via
`prtDataGenUnimodal(40,mu_0,mu_1,Sigma,Sigma)`.

Example:

```
D = 30;
mu_0 = zeros(1,D);
mu_1 = [3,zeros(1,D-1)];
Sigma = eye(D);
```

Answer: $A < D < B = C$. FLD overfits badly. PCA actually overfits slightly, choosing a suboptimal vector due to the noise. SFS and SBS both choose the first feature (and a random other), keeping all of the useful information and preventing FLD from overfitting.

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1.
```
D = 30;
mu_0 = zeros(1,D);
mu_1 = ones(1,D);
Sigma = eye(D);
```

2.
```
D = 3;
mu_0 = [0,0,0];
mu_1 = [0.5,0.5,1];
Sigma = [1,  -0.9, 0;
        -0.9, 1,   0;
         0,   0,   1];
```

3.
```
D = 3;
mu_0 = [0,0,0,0];
mu_1 = [1,1,1,0];
Sigma = diag([1,1,1,3]);
```