instance	a1	a2	a3	class
1	m	x	a	yes
2	f	y	b	yes
3	m	y	c	yes
4	f	y	c	yes
5	m	x	c	yes
6	f	y	d	no
7	m	y	a	no
8	f	x	a	no
9	m	y	a	no
10	f	x	c	no

find root node

split on a1

	a1=M
Y	3
N	2
gini	0.48

	a1=F
Y	2
N	3
gini	0.48

GINI1: $1 - (3/5)^2 - (2/5)^2 = 0.48$
GINI2: $1 - (2/5)^2 - (3/5)^2 = 0.48$

GINI: (5/10) * 0.48 + (5/10) * 0.48 = 0.48

split on a2

	a2=X
Y	2
N	2
gini	0.5

	a2=Y
Y	3
N	3
gini	0.5

GINI1: 1 - $(2/4)^2$ - $(2/4)^2$ = 0.5
GINI2: 1 - $(3/6)^2$ - $(3/6)^2$ = 0.5
GINI: (4/10) * 0.5 + (6/10) * 0.5 = 0.5

split on a3

	a3=A
Y	1
N	3
gini	0.375

GINI1: 1 - $(1/4)^2$ - $(3/4)^2$ = 0.375

	a3=B
Y	1
N	0
gini	0

GINI2: 1 - $(1/1)^2$ - $(0/1)^2$ = 0

	a3=C
Y	3
N	1
gini	0.375

GINI3: 1 - $(3/4)^2$ - $(1/4)^2$ = 0.375

	a3=D
Y	0
N	1
gini	0

GINI4: 1 - $(0/1)^2$ - $(1/1)^2$ = 0

Splitting on a3=D has the lowest gini value, and is selected as root node.

find 2. node

split on next node

Splitting on a3=B has the lowest gini value, and is selected as next node.

find 3. node

Splitting on a3=A has the lowest gini value, and is selected as next node.

instance	a1	a2	a3	class
1	m	x	a	yes

3	m	y	c	yes
4	f	y	c	yes
5	m	x	c	yes

7	m	y	a	no
8	f	x	a	no
9	m	y	a	no
10	f	x	c	no

split on a1

	a1=M
Y	3
N	2
gini	0.48

	a1=F
Y	2
N	3
gini	0.48

GINI1: $1 - (3/5)^2 - (2/5)^2 = 0.48$
GINI2: $1 - (2/5)^2 - (3/5)^2 = 0.48$
GINI: $(5/10) * 0.48 + (5/10) * 0.48 = 0.48$

split on a2

	a2=X
Y	2
N	2
gini	0.5

	a2=Y
Y	3
N	3

	a2=Y
gini	0.5

GINI1: 1 - $(2/4)^2$ - $(2/4)^2$ = 0.5
GINI2: 1 - $(3/6)^2$ - $(3/6)^2$ = 0.5
GINI: (4/10) * 0.5 + (6/10) * 0.5 = 0.5

split on a3

	a3=A
Y	1
N	3
gini	0.375

GINI1: 1 - $(1/4)^2$ - $(3/4)^2$ = 0.375

	a3=B
Y	1
N	0
gini	0

GINI2: 1 - $(1/1)^2$ - $(0/1)^2$ = 0

	a3=C
Y	3
N	1
gini	0.375

GINI3: 1 - $(3/4)^2$ - $(1/4)^2$ = 0.375

	a3=D
Y	0

	a3=D
N	1
gini	0

GINI4: $1 - (0/1)^2 - (1/1)^2 = 0$

6.