1.(a)

LEVEL 1

	Total
T	7
F	9
Entropy = 0.9887	

	BLUE	WHITE
T	5	2
F	3	6
Gain = 0.106		

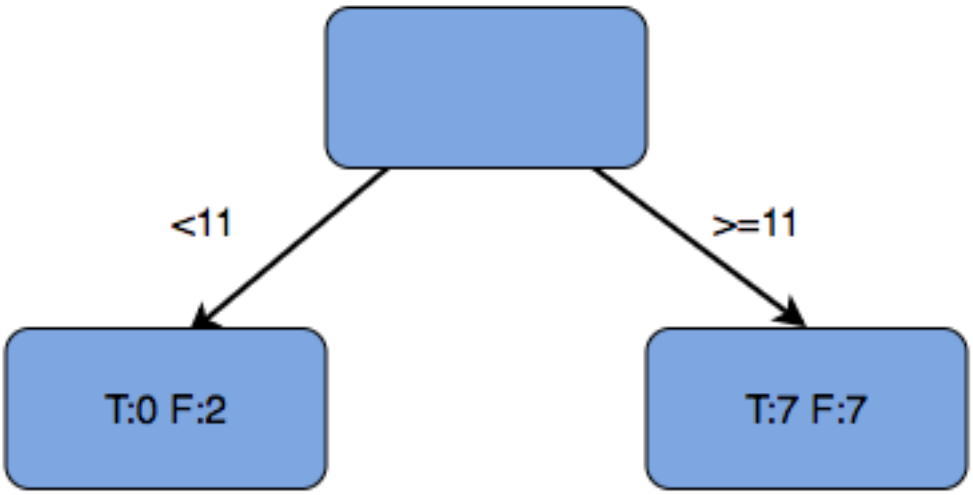
	SMALL	LARGE
T	5	2
F	3	6
Gain = 0.106		

	LOW	HIGH
T	5	2
F	3	6
Gain = 0.106		

	COOL	HOT
T	5	2
F	3	6
Gain = 0.106		

	7		10		11		13		15		18		20		22		27		30		32		35		37		40		43		50	
T	0	7	0	7	0	7	1	6	1	6	2	5	2	5	2	5	2	5	3	4	4	3	5	2	6	1	6	1	7	0	7	0
F	0	9	1	8	2	7	2	7	3	6	3	6	4	5	5	4	6	3	6	3	6	3	6	3	6	3	7	2	7	2	8	1
Gain	null		0.054		0.137		0.007		0.036		0.002		0.019		0.054		0.106		0.041		0.007		0.002		0.004		0.007		0.137		0.054	

Based on the results, we can choose either 11 or 43, now we choose 11 to split the node.



Level 2

For the right >=11 approach:

	TOTAL
T	7
F	7
Entropy = 1	

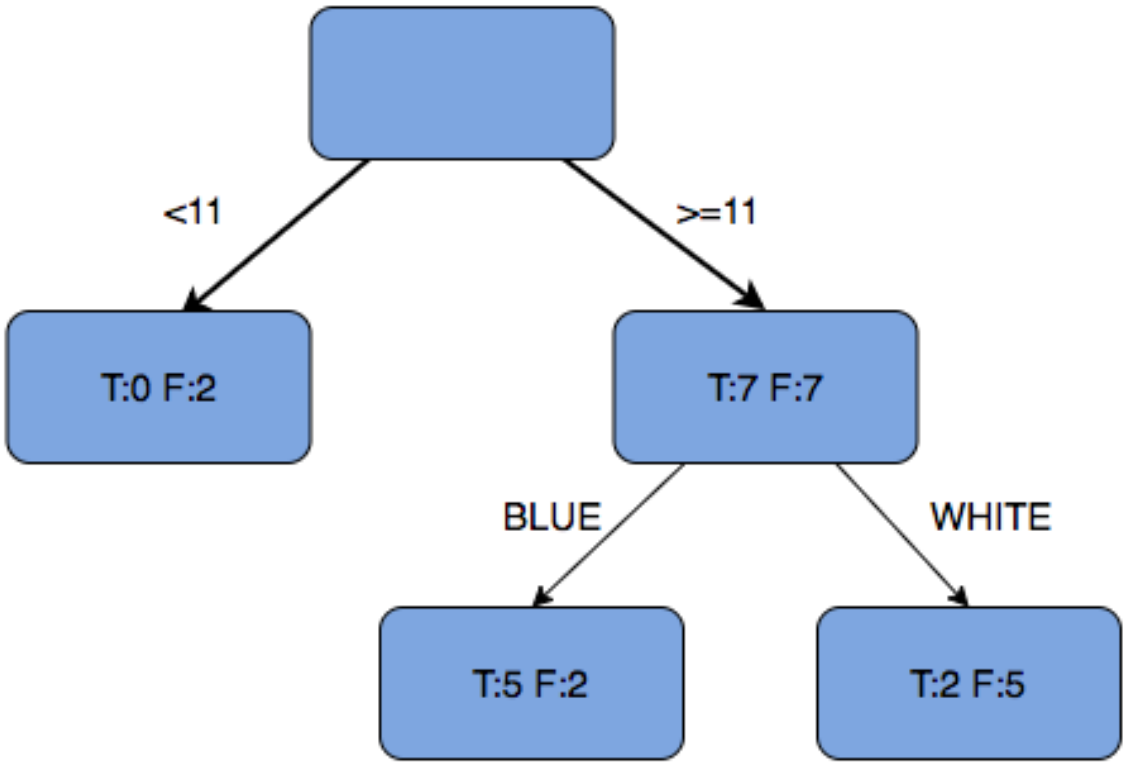
	LOW	HIGH
T	3	2
F	5	4
Gain =0.061		

	BLUE	WHITE
T	5	2
F	2	5
Gain = 0.1369		

	SHORT	LONG
T	5	2
F	2	5
Gain =0.1369		

	COOL	HOT
T	5	2
F	2	5
Gain = 0.1369		

So, we can BLUE/WHITE for right approach.



LEVEL 3

For the BLUE approach,

	Total
T	5
F	2
Entropy = 0.863	

	SHORT	LONG
T	4	1
F	0	2
Gain = 0.4695		

	COOL	HOT
T	3	2
F	1	1
Gain = 0.0059		

	LOW	HIGH
T	3	2
F	1	1
Gain = 0.0059		

For the WHITE approach,

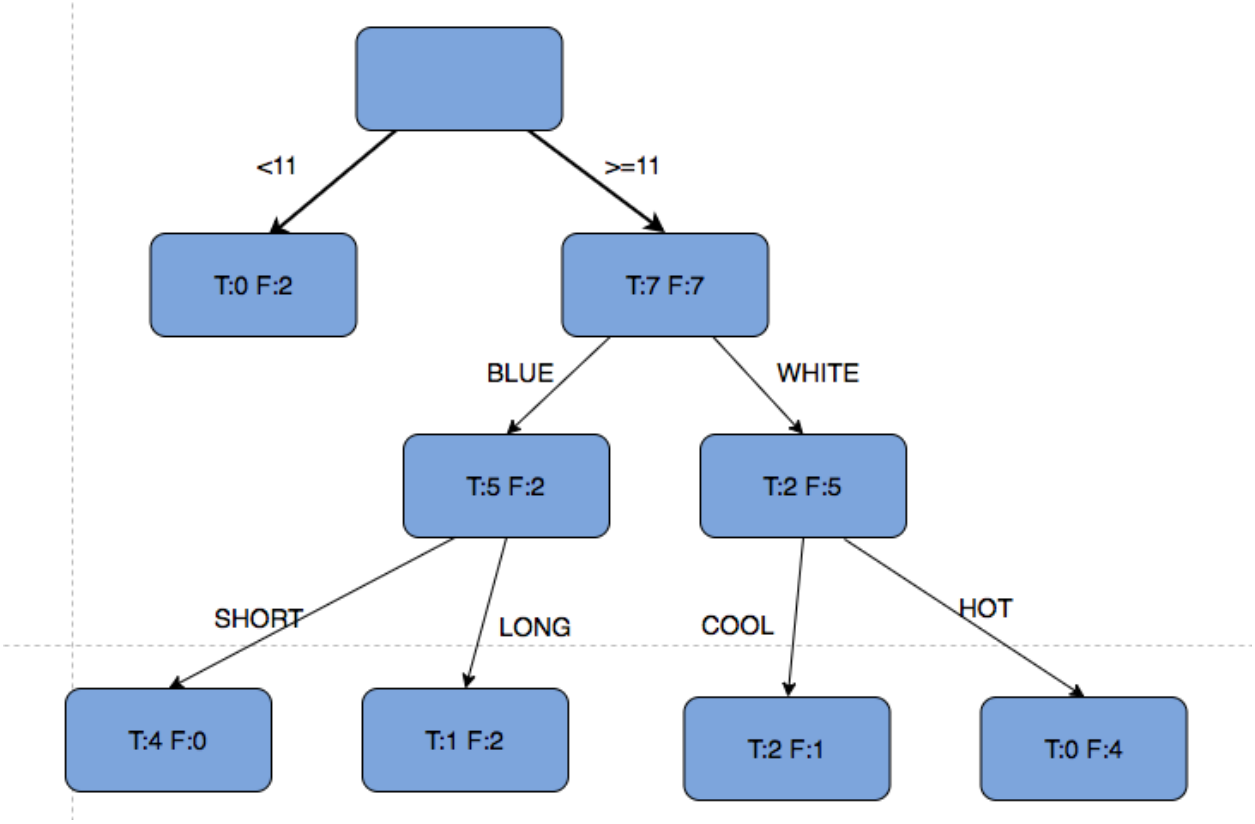
	Total
T	2
F	5
Entropy = 0.863	

	SHORT	LONG
T	1	1
F	2	3
Gain = 0.0059		

	COOL	HOT
T	2	0
F	1	4
Gain **= 0.4695**		

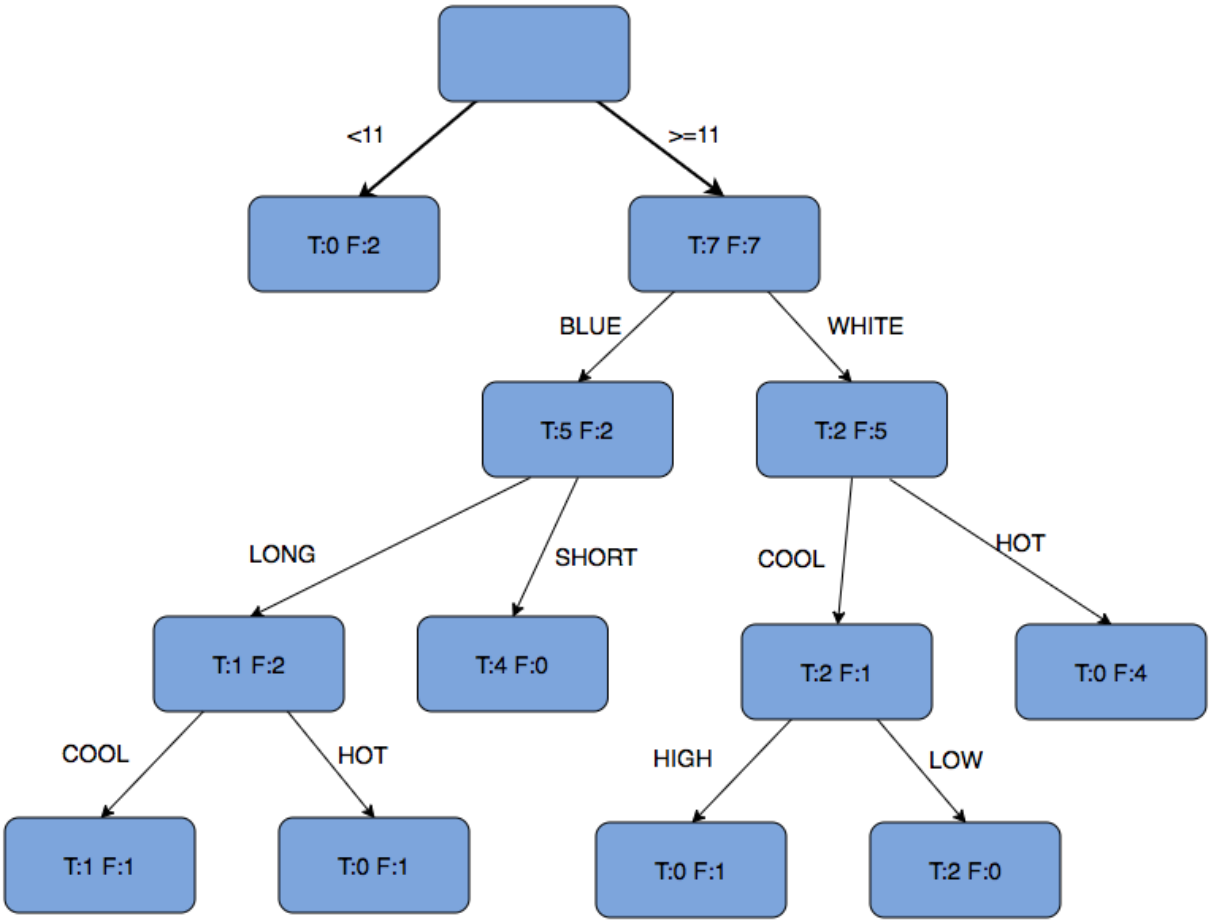
	LOW	HIGH
T	2	0
F	2	3
Gain = 0.2916		

So, we can choose SHORT/LONG for the left approach and also COOL/HOT for the right approach.



LEVEL 4

Continue this process, the final tree is:



1.(b)

LEVEL 1

	Total
T	7
F	9
Gini = 0.492	

	BLUE	WHITE
T	5	2
F	3	6
Gini = 0.422		

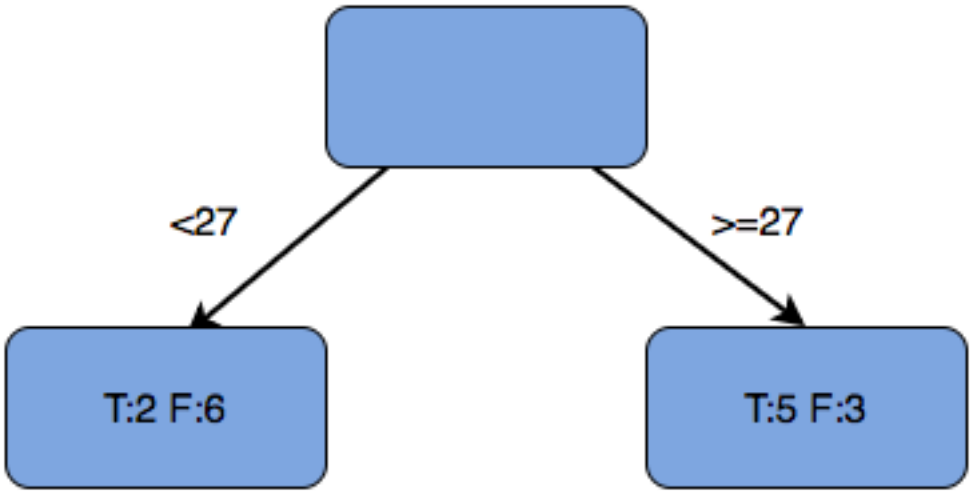
	SHORT	LONG
T	5	2
F	3	6
Gini =0.422		

	COOL	HOT
T	5	2
F	3	6
Gini = 0.422		

	LOW	HIGH
T	5	2
F	3	6
Gini = 0.422		

	7		10		11		13		15		18		20		22		27		30		32		35		37		40		43		50	
T	0	7	0	7	0	7	1	6	1	6	2	5	2	5	2	5	2	5	3	4	4	3	5	2	6	1	6	1	7	0	7	0
F	0	9	1	8	2	7	2	7	3	6	3	6	4	5	5	4	6	3	6	3	6	3	6	3	6	3	7	2	7	2	8	1
Gini	null		0.467		0.438		0.487		0.486		0.491		0.479		0.456		0.422		0.464		0.488		0.491		0.469		0.487		0.438		0.467	

For Level 1, we pick continuous attribute to split the tree.



LEVEL 2

For the left <27 approach:

	BLUE	WHITE
T	2	0
F	2	4
Gini = 0.25		

	LONG	SHORT
T	0	2
F	4	2
Gini =0.25		

	COOL	HOT
T	1	1
F	3	3
Gini =0.375		

For the right >=27 approach:

	BLUE	WHITE
T	3	2
F	1	2
Gini = 0.4375		

	LONG	SHORT
T	2	3
F	2	1
Gini =0.4375		

	COOL	HOT
T	4	1
F	0	3
Gini =0.1875		

So, we can choose BLUE/WHITE for the left approach and COOL/HOT for the right approach.