	<pre>#import 1 import nu import pa import ma import se</pre>	mpy <b>as</b> np ndas <b>as</b> po tplotlib.	yplot <b>as</b> pl	t		
	<pre>df = pd.r df.head(1</pre>	0)	C:\\Users\\a	Cer\\Desktop\ PetalLengthCm  1.4  1.4	PetalWidth	nCm Species  0.2 Iris-setosa  0.2 Iris-setosa
	<ul> <li>2 3</li> <li>3 4</li> <li>4 5</li> <li>5 6</li> <li>6 7</li> <li>7 8</li> <li>9 0</li> </ul>	4.7 4.6 5.0 5.4 4.6 5.0	3.2 3.1 3.6 3.9 3.4 3.4	1.4 1.7 1.4 1.5		<ul> <li>0.2 Iris-setosa</li> <li>0.2 Iris-setosa</li> <li>0.2 Iris-setosa</li> <li>0.4 Iris-setosa</li> <li>0.3 Iris-setosa</li> <li>0.2 Iris-setosa</li> </ul>
[4]:	<pre>8 9 9 10 #shape of df.shape (150, 6)</pre>			1.4		<ul><li>0.2 Iris-setosa</li><li>0.1 Iris-setosa</li></ul>
ic[ɔ].	#checking df.isnull  Id SepalLengt SepalWidth PetalLengt PetalWidth	0 chCm 0 nCm 0	values			
[12]: [12]:	Species dtype: int	0 c64 cal variates cal variates cal color				
	<pre>#independ X = df.il #dependen y = df.il</pre>	cies, dtyp  lent varial  oc[:,:-1]  t variable	oles values			
	(array([[1 [2 [3 [4 [5 [6 [7	2.00e+00, 3.00e+00, 4.00e+00, 5.00e+00, 7.00e+00, 8.00e+00, 9.00e+00,	4.90e+00, 3. 4.70e+00, 3. 4.60e+00, 3. 5.00e+00, 3. 4.60e+00, 3. 5.00e+00, 3. 4.40e+00, 2.	50e+00, 1.40 00e+00, 1.40 20e+00, 1.30 10e+00, 1.50 60e+00, 1.40 90e+00, 1.40 40e+00, 1.50 90e+00, 1.40 10e+00, 1.50 10e+00, 1.50	0e+00, 2.0 0e+00, 2.0 0e+00, 2.0 0e+00, 2.0 0e+00, 3.0 0e+00, 3.0 0e+00, 2.0	00e-01], 00e-01], 00e-01], 00e-01], 00e-01], 00e-01],
	[1 [1 [1 [1 [1 [1 [1	10e+01, 20e+01, 30e+01, 40e+01, 50e+01, 70e+01, 80e+01, 90e+01,	5.40e+00, 3.4.80e+00, 3.4.80e+00, 3.4.30e+00, 4.5.70e+00, 4.5.10e+00, 3.5.70e+00, 3.5.10e+00, 3.5.10e+000, 3.5.10e+000, 3.5.10e+000, 3.5.10e+000, 3.5.10e+000, 3.5.10e+000, 3.5.10e+000, 3.5.10e+000,	70e+00, 1.50 40e+00, 1.60 00e+00, 1.40 00e+00, 1.10 00e+00, 1.20 40e+00, 1.50 90e+00, 1.30 50e+00, 1.40 80e+00, 1.70 80e+00, 1.50	0e+00, 2.0 0e+00, 2.0 0e+00, 1.0 0e+00, 1.0 0e+00, 2.0 0e+00, 4.0 0e+00, 3.0 0e+00, 3.0 0e+00, 3.0	00e-01], 00e-01], 00e-01], 00e-01], 00e-01], 00e-01], 00e-01], 00e-01],
	[2 [2 [2 [2 [2 [2 [3	2.20e+01, 2.30e+01, 2.40e+01, 2.50e+01, 2.60e+01, 2.70e+01, 2.80e+01, 3.00e+01,	5.10e+00, 3. 4.60e+00, 3. 5.10e+00, 3. 4.80e+00, 3. 5.00e+00, 3. 5.20e+00, 3. 6.20e+00, 3. 4.70e+00, 3.	40e+00, 1.70 70e+00, 1.50 60e+00, 1.00 30e+00, 1.70 40e+00, 1.60 40e+00, 1.60 50e+00, 1.50 40e+00, 1.40 20e+00, 1.60 10e+00, 1.60	0e+00, 4.0 0e+00, 2.0 0e+00, 5.0 0e+00, 2.0 0e+00, 2.0 0e+00, 4.0 0e+00, 2.0 0e+00, 2.0	00e-01], 00e-01], 00e-01], 00e-01], 00e-01], 00e-01], 00e-01],
	[3 [3 [3 [3 [3 [4]	3.30e+01, 3.40e+01, 3.50e+01, 3.60e+01, 3.70e+01, 3.80e+01, 3.90e+01, 4.00e+01,	5.20e+00, 4. 5.50e+00, 4. 4.90e+00, 3. 5.50e+00, 3. 5.50e+00, 3. 4.90e+00, 3. 6.10e+00, 3. 5.00e+00, 3.	40e+00, 1.50 10e+00, 1.50 20e+00, 1.40 10e+00, 1.50 20e+00, 1.20 50e+00, 1.30 10e+00, 1.30 40e+00, 1.50 50e+00, 1.30 30e+00, 1.30	0e+00, 1.0 0e+00, 2.0 0e+00, 1.0 0e+00, 2.0 0e+00, 2.0 0e+00, 2.0 0e+00, 2.0 0e+00, 2.0 0e+00, 3.0	00e-01], 00e-01], 00e-01], 00e-01], 00e-01], 00e-01], 00e-01], 00e-01],
	[4 [4 [4 [4 [4 [5 [5	1.30e+01, 1.40e+01, 1.50e+01, 1.60e+01, 1.70e+01, 1.90e+01, 1.00e+01, 1.10e+01, 1.20e+01,	4.40e+00, 3. 5.00e+00, 3. 5.10e+00, 3. 4.80e+00, 3. 5.10e+00, 3. 6.30e+00, 3. 7.00e+00, 3. 6.40e+00, 3.	20e+00, 1.30 50e+00, 1.60 80e+00, 1.90 00e+00, 1.40 80e+00, 1.60 20e+00, 1.50 30e+00, 1.40 20e+00, 4.70 20e+00, 4.50	0e+00, 2.0 0e+00, 6.0 0e+00, 4.0 0e+00, 3.0 0e+00, 2.0 0e+00, 2.0 0e+00, 2.0 0e+00, 1.0 0e+00, 1.0	00e-01], 00e-01], 00e-01], 00e-01], 00e-01], 00e-01], 00e-01], 00e-01], 00e-01],
	[5 [5 [5 [5 [6 [6	5.40e+01, 5.50e+01, 6.60e+01, 6.70e+01, 6.80e+01, 6.90e+01, 6.10e+01, 6.20e+01,	5.50e+00, 2. 6.50e+00, 2. 5.70e+00, 2. 6.30e+00, 3. 4.90e+00, 2. 6.60e+00, 2. 5.20e+00, 2. 5.90e+00, 3.	10e+00, 4.90 30e+00, 4.60 80e+00, 4.50 30e+00, 4.70 40e+00, 3.30 90e+00, 4.60 70e+00, 3.50 00e+00, 4.20 20e+00, 4.00	0e+00, 1.3 0e+00, 1.3 0e+00, 1.3 0e+00, 1.6 0e+00, 1.6 0e+00, 1.6 0e+00, 1.6 0e+00, 1.6	30e+00], 50e+00], 30e+00], 60e+00], 30e+00], 40e+00], 50e+00],
	[6 [6 [6 [6 [7 [7 [7	5.40e+01, 5.50e+01, 5.60e+01, 5.70e+01, 5.80e+01, 7.00e+01, 7.10e+01, 7.20e+01, 7.30e+01,	6.10e+00, 2. 6.60e+00, 2. 6.70e+00, 3. 6.60e+00, 2. 6.20e+00, 2. 6.60e+00, 2. 6.90e+00, 3. 6.10e+00, 2. 6.30e+00, 2.	90e+00, 4.70 90e+00, 3.60 10e+00, 4.40 00e+00, 4.50 70e+00, 4.10 20e+00, 4.50 50e+00, 3.90 20e+00, 4.80 80e+00, 4.00 50e+00, 4.90	0e+00, 1.3	40e+00], 30e+00], 40e+00], 50e+00], 50e+00], 10e+00], 80e+00], 30e+00],
	[7 [7 [7 [7 [8 [8 [8	7.50e+01, 7.60e+01, 7.70e+01, 7.80e+01, 7.90e+01, 8.10e+01, 8.20e+01, 8.30e+01, 8.40e+01,	6.40e+00, 2.6.60e+00, 3.6.80e+00, 2.6.70e+00, 2.6.70e+00, 2.6.50e+00, 2.6.50e+00, 2.6.80e+00, 2.6.00e+00, 2.6.00e+	80e+00, 4.70 90e+00, 4.30 00e+00, 4.40 80e+00, 5.00 90e+00, 5.00 60e+00, 3.50 40e+00, 3.70 70e+00, 3.90 70e+00, 5.10	0e+00, 1.3 0e+00, 1.4 0e+00, 1.4 0e+00, 1.5 0e+00, 1.5 0e+00, 1.5 0e+00, 1.6 0e+00, 1.6 0e+00, 1.6 0e+00, 1.6 0e+00, 1.6	30e+00], 40e+00], 40e+00], 70e+00], 50e+00], 10e+00], 20e+00], 60e+00],
	8] 8] 8] 9] 9] 9] 9]	3.50e+01, 3.60e+01, 3.70e+01, 3.80e+01, 3.90e+01, 3.10e+01, 3.20e+01, 3.30e+01, 3.40e+01,	5.40e+00, 3. 6.00e+00, 3. 6.70e+00, 3. 6.30e+00, 2. 6.60e+00, 3. 6.50e+00, 2. 6.10e+00, 3. 6.80e+00, 2. 6.00e+00, 2.	00e+00, 4.50 40e+00, 4.50 10e+00, 4.70 30e+00, 4.40 00e+00, 4.00 60e+00, 4.60 60e+00, 4.60 60e+00, 3.30 70e+00, 4.20	0e+00, 1.9 0e+00, 1.9 0e+00, 1.9 0e+00, 1.3	50e+00], 60e+00], 50e+00], 30e+00], 30e+00], 20e+00], 40e+00], 20e+00], 30e+00],
	[9 [9 [9 [1 [1 [1 [1	0.60e+01, 0.70e+01, 0.80e+01, 0.90e+01, 0.00e+02, 0.01e+02, 0.02e+02, 0.03e+02, 0.04e+02, 0.05e+02,	5.70e+00, 3. 5.70e+00, 2. 6.20e+00, 2. 5.10e+00, 2. 6.30e+00, 3. 6.80e+00, 2. 7.10e+00, 3. 6.30e+00, 2. 6.50e+00, 3.	00e+00, 4.20 90e+00, 4.30 50e+00, 3.00 80e+00, 4.10 30e+00, 5.10 00e+00, 5.60 00e+00, 5.80	0e+00, 1.3 0e+00, 1.3 0e+00, 1.3 0e+00, 1.3 0e+00, 1.3 0e+00, 1.3 0e+00, 2.3 0e+00, 2.3 0e+00, 2.3 0e+00, 2.3	20e+00], 30e+00], 30e+00], 10e+00], 30e+00], 50e+00], 90e+00], 80e+00], 20e+00],
	[1 [1 [1 [1 [1 [1 [1	06e+02, 07e+02, 08e+02, 09e+02, 10e+02, 12e+02, 13e+02, 14e+02,	7.60e+00, 3. 4.90e+00, 2. 7.30e+00, 2. 6.70e+00, 2. 7.20e+00, 3. 6.50e+00, 2. 6.80e+00, 2. 6.80e+00, 2.	00e+00, 5.80 00e+00, 6.60 50e+00, 4.50 90e+00, 5.80 60e+00, 5.10 70e+00, 5.30 00e+00, 5.50 50e+00, 5.00 80e+00, 5.10 20e+00, 5.30 80e+00, 5.30	0e+00, 2.3 0e+00, 1.3 0e+00, 1.8 0e+00, 1.8 0e+00, 2.3 0e+00, 2.3 0e+00, 2.3 0e+00, 2.3 0e+00, 2.3	10e+00], 70e+00], 80e+00], 80e+00], 50e+00], 90e+00], 10e+00], 40e+00],
	[1 [1 [1 [1 [1 [1 [1	17e+02, 18e+02, 19e+02, 20e+02, 21e+02, 22e+02, 23e+02, 24e+02,	5.50e+00, 3.7.70e+00, 3.7.70e+00, 2.6.00e+00, 2.6.90e+00, 2.7.70e+00, 2.6.30e+00, 2.6.70e+00, 3.7.70e+00, 3.7.70e+	20e+00, 5.30 00e+00, 5.50 80e+00, 6.70 60e+00, 5.00 20e+00, 5.70 80e+00, 4.90 80e+00, 6.70 70e+00, 4.90 30e+00, 5.70 20e+00, 6.00	0e+00, 1.8 0e+00, 2.2 0e+00, 2.3 0e+00, 1.8 0e+00, 2.3 0e+00, 2.3 0e+00, 2.3 0e+00, 2.3 0e+00, 2.3 0e+00, 2.3	30e+00], 20e+00], 30e+00], 50e+00], 30e+00], 00e+00], 30e+00], 10e+00],
	[1 [1 [1 [1 [1 [1 [1	27e+02, 28e+02, 29e+02, 30e+02, 31e+02, 32e+02, 34e+02, 35e+02,	6.20e+00, 2. 6.10e+00, 3. 6.40e+00, 2. 7.20e+00, 3. 7.40e+00, 2. 7.90e+00, 3. 6.40e+00, 2. 6.30e+00, 2. 7.70e+00, 3.	80e+00, 4.80 00e+00, 4.90 80e+00, 5.60 00e+00, 5.80 80e+00, 6.10 80e+00, 5.60 80e+00, 5.60 60e+00, 5.60 00e+00, 6.10	0e+00, 1.8 0e+00, 2.3 0e+00, 2.3 0e+00, 1.6 0e+00, 1.6 0e+00, 1.5 0e+00, 2.6 0e+00, 1.6 0e+00, 2.6 0e+00, 2.6	80e+00], 80e+00], 10e+00], 60e+00], 90e+00], 20e+00], 50e+00], 40e+00],
	[1 [1 [1 [1 [1 [1	38e+02, 39e+02, 40e+02, 41e+02, 42e+02, 43e+02, 45e+02, 46e+02,	6.40e+00, 3. 6.00e+00, 3. 6.90e+00, 3. 6.70e+00, 3. 6.90e+00, 3. 6.80e+00, 2. 6.80e+00, 3. 6.70e+00, 3.	40e+00, 5.60 10e+00, 5.50 00e+00, 4.80 10e+00, 5.40 10e+00, 5.60 10e+00, 5.10 70e+00, 5.90 30e+00, 5.70 00e+00, 5.20 50e+00, 5.00	0e+00, 1.8 0e+00, 2.3	80e+00], 80e+00], 10e+00], 40e+00], 30e+00], 90e+00], 50e+00], 30e+00],
	[1 [1] array(['I 'I 'I 'I 'I	48e+02, 49e+02, 50e+02, ris-setos ris-setos ris-setos ris-setos ris-setos ris-setos	5.50e+00, 3. 6.20e+00, 3. 5.90e+00, 3. a', 'Iris-se	00e+00, 5.20 40e+00, 5.40 00e+00, 5.10 etosa', 'Iris etosa', 'Iris etosa', 'Iris etosa', 'Iris etosa', 'Iris etosa', 'Iris etosa', 'Iris etosa', 'Iris etosa', 'Iris	0e+00, 2.0 0e+00, 2.3 0e+00, 1.8 s-setosa', s-setosa', s-setosa', s-setosa', s-setosa', s-setosa', s-setosa', s-setosa',	00e+00], 30e+00], 80e+00]]), 'Iris-seto, 'Iris-seto, 'Iris-seto, 'Iris-seto, 'Iris-seto,
	'! '! '! '! '! '!	ris-setos ris-setos ris-setos ris-setos ris-versi ris-versi ris-versi ris-versi	a', 'Iris-se a', 'Iris-se a', 'Iris-se a', 'Iris-se a', 'Iris-se color', 'Iri color', 'Iri color', 'Iri color', 'Iri	etosa', 'Iris etosa', 'Iris etosa', 'Iris etosa', 'Iris etosa', 'Iris es-versicolor es-versicolor es-versicolor es-versicolor es-versicolor	s-setosa', s-setosa', s-setosa', s-setosa', s-versicol a', 'Iris- a', 'Iris- a', 'Iris- a', 'Iris- a', 'Iris-	, 'Iris-set, 'Iris-set, 'Iris-set, 'Iris-set, 'Iris-setlor', 'Iris-versicolor
	'! '! '! '! '! !!	ris-versi ris-versi ris-versi ris-versi ris-versi ris-versi ris-versi	color', 'Iri	.s-versicolor .s-versicolor .s-versicolor .s-versicolor .s-versicolor .s-versicolor .s-versicolor .s-versicolor .s-versicolor .s-versicolor	c', 'Iris-	-versicolo -versicolo -versicolo -versicolo -versicolo -versicolo -versicolo -versicolo
	'! '! '! '! '! !'	ris-virgi ris-virgi ris-virgi ris-virgi ris-virgi ris-virgi ris-virgi ris-virgi	nica', 'Iris	s-versicolor -virginica', -virginica', -virginica', -virginica', -virginica', -virginica', -virginica', -virginica', -virginica',	'Iris-v:	irginica' irginica' irginica' irginica' irginica' irginica' irginica' irginica' irginica'
īn [19]:	'I 'I 'I 'I 'I #checking	Tris-virgi Tris-virgi Tris-virgi Tris-virgi Tris-virgi Tris-virgi	nica', 'Iris nica', 'Iris nica', 'Iris nica', 'Iris nica', 'Iris nica', 'Iris	s-virginica', s-virginica', s-virginica', s-virginica', s-virginica', s-virginica', s-virginica', s-virginica'] two variable gthCm'], y=df	'Iris-v: 'Iris-v: 'Iris-v: 'Iris-v: 'Iris-v: dtype=d	irginica', irginica', irginica', irginica', irginica', object))
ut[19]:		ot:xlabel	='SepalLengt	thCm', ylabel	L='Species	
- F201.	Iris-versicoid		5.0 5.5	•••••		
n [20]:   Dut[20]:		ot:xlabel	='SepalWidth	thCm'],y=df[ aCm', ylabel=	='Species	
	श्री Iris-versicolo प्रे		2.5 3.0 Sep	••••	4.0	4.5
n [21]:		ot:xlabel	='PetalLengt	gthCm'],y=df		
	ि Iris-versicolo		2 3	• • • • • • • • • • • • • • • • • • •	• <b>••••••••••••••••••••••••••••••••••••</b>	7
n [22]:		.ot:xlabel	='SepalWidth	thCm'],y=df[ aCm', ylabel=	='Species	
	ਪੁੱਛੇ Iris-versicolo ਨੇ Iris-virginio		2.5 3.0	3.5	4.0	4.5
n [68]: ut[68]:	<pre>from skle X_train, X_train.s</pre>	arn.model X_test, y hape, X_te	selection <b>i</b> train, y_te	<pre>mport train_t st = train_te _train.shape;</pre>	est_split	(X,y,test_si
n [69]:	<pre>#creating knn = KNe knn.fit(X y_pred =</pre>	the knn of ighborsClassin, yoknn.predic	object assifier() _train) #bu	KNeighborsCla		
Out[69]: In [38]:	<pre>knn.score  1.0  #classifi from skle print(classifi)</pre>	cation per	r_test)  rformance me  cs import cl  on_report(y_	trics assification pred, y_test	2.))	
	Print(con  Iris-s Iris-versi Iris-virg	fusion_material processes and color ginica	ecision r 1.00 1.00 1.00	1.00 1 1.00 1 1.00 1	core sup	11 13 6
n [48]: ut[48]:	macr weighte	ed avg  to know  ap(confus:		1.00 1	1.00 1.00	30 30
	1 0			- 12 - 10 - 8 - 6 - 4		
In [ ]:	# Support	Vector C.	lassifier	-2		
	<pre>svc = SVC svc.fit(X y_pred = svc.score  1.0  from skle</pre>	c()  Ltrain, y svc.predic (X_test, y arn.metric	_train) ct(X_test) 7_test) cs import cl	assification_	_	
	Print(cla	setosa color ginica curacy	n_report(y_ ecision r  1.00 1.00 1.00	pred, y_test;  recall f1-sc  1.00 1  1.00 1  1.00 1	2))	pport  11 13 6 30 30 30 30
In [ ]:   In [60]:   In [64]:	<pre># Decisio  from skle  dt = Deci</pre>	arn.tree :	assifier  mport Decis  assifier()	ionTreeClass		
Out[64]: In [65]:	<pre>dt.fit(X_   y_pred =   dt.score( 0.9666666666666666666666666666666666666</pre>	train, y dt.predict X_test, y 666666667	crain) c(X_test) test) on_report(y_	pred, y_test; recall f1-sc		pport
	macr weighte	setosa color ginica curacy co avg	1.00 1.00 0.83	1.00 1 0.93 0 1.00 0 0 0.98 0 0.97 0	1.00 0.96 0.91 0.97 0.96	11 14 5 30 30 30
n [67]: out[67]:	plot_tree [Text(200. Text(133. Text(66.9 Text(200.	88000000 92000000 860000000 88000000	00002, 108.7 0001, 36.239 00002, 36.23	2, 'X[0] <= 1 72, 'X[4] <= 9999999999998, 899999999998 72, 'gini = 0	0.8\ngin: 'gini = 3, 'gini =	i = 0.5\nsample: 0.0\nsample: = 0.0\nsample
	gini = samples value = [3	X[4] <= gini = ( samples value = [39 / 0.0 s = 39	samples = 12 alue = [39, 37, 0.8 0.5 = 76	gini = 0.0 imples = 44 ie = [0, 0, 44]		