In [2]:
```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

In [3]:
```
train_df=pd.read_csv(r"C:\Users\jangidi veena\OneDrive\Documents\jupyter\Mobile_Price_Classifi
train_df
```

Out[3]:

	battery_power	blue	clock_speed	dual_sim	fc	four_g	int_memory	m_dep	mobile_wt	n_cores	...	px_heig
0	842	0	2.2	0	1	0	7	0.6	188	2	...	2
1	1021	1	0.5	1	0	1	53	0.7	136	3	...	90
2	563	1	0.5	1	2	1	41	0.9	145	5	...	126
3	615	1	2.5	0	0	0	10	0.8	131	6	...	12
4	1821	1	1.2	0	13	1	44	0.6	141	2	...	120
...	...	...	...	...	...	...	...	...	...	...	...	
1995	794	1	0.5	1	0	1	2	0.8	106	6	...	122
1996	1965	1	2.6	1	0	0	39	0.2	187	4	...	9
1997	1911	0	0.9	1	1	1	36	0.7	108	8	...	86
1998	1512	0	0.9	0	4	1	46	0.1	145	5	...	33
1999	510	1	2.0	1	5	1	45	0.9	168	6	...	48

2000 rows × 21 columns

In [4]:
```
test_df=pd.read_csv(r"C:\Users\jangidi veena\OneDrive\Documents\jupyter\Mobile_Price_Classifica
test_df
```

Out[4]:

	id	battery_power	blue	clock_speed	dual_sim	fc	four_g	int_memory	m_dep	mobile_wt	...	pc	px_heig
0	1	1043	1	1.8	1	14	0	5	0.1	193	...	16	22
1	2	841	1	0.5	1	4	1	61	0.8	191	...	12	74
2	3	1807	1	2.8	0	1	0	27	0.9	186	...	4	127
3	4	1546	0	0.5	1	18	1	25	0.5	96	...	20	29
4	5	1434	0	1.4	0	11	1	49	0.5	108	...	18	74
...	...	...	...	...	...	...	...	...	...	...	...	...	
995	996	1700	1	1.9	0	0	1	54	0.5	170	...	17	64
996	997	609	0	1.8	1	0	0	13	0.9	186	...	2	115
997	998	1185	0	1.4	0	1	1	8	0.5	80	...	12	47
998	999	1533	1	0.5	1	0	0	50	0.4	171	...	12	3
999	1000	1270	1	0.5	0	4	1	35	0.1	140	...	19	45

1000 rows × 21 columns

In [5]:
```
train_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2000 entries, 0 to 1999
Data columns (total 21 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   battery_power  2000 non-null   int64  
 1   blue           2000 non-null   int64  
 2   clock_speed    2000 non-null   float64
 3   dual_sim       2000 non-null   int64  
 4   fc             2000 non-null   int64  
 5   four_g         2000 non-null   int64  
 6   int_memory     2000 non-null   int64  
 7   m_dep          2000 non-null   float64
 8   mobile_wt      2000 non-null   int64  
 9   n_cores        2000 non-null   int64  
 10  pc             2000 non-null   int64  
 11  px_height      2000 non-null   int64  
 12  px_width       2000 non-null   int64  
 13  ram            2000 non-null   int64  
 14  sc_h           2000 non-null   int64  
 15  sc_w           2000 non-null   int64  
 16  talk_time      2000 non-null   int64  
 17  three_g        2000 non-null   int64  
 18  touch_screen   2000 non-null   int64  
 19  wifi           2000 non-null   int64  
 20  price_range    2000 non-null   int64  
dtypes: float64(2), int64(19)
memory usage: 328.3 KB
```

In [6]:
```
test_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 21 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   id             1000 non-null   int64  
 1   battery_power  1000 non-null   int64  
 2   blue           1000 non-null   int64  
 3   clock_speed    1000 non-null   float64
 4   dual_sim       1000 non-null   int64  
 5   fc             1000 non-null   int64  
 6   four_g         1000 non-null   int64  
 7   int_memory     1000 non-null   int64  
 8   m_dep          1000 non-null   float64
 9   mobile_wt      1000 non-null   int64  
 10  n_cores        1000 non-null   int64  
 11  pc             1000 non-null   int64  
 12  px_height      1000 non-null   int64  
 13  px_width       1000 non-null   int64  
 14  ram            1000 non-null   int64  
 15  sc_h           1000 non-null   int64  
 16  sc_w           1000 non-null   int64  
 17  talk_time      1000 non-null   int64  
 18  three_g        1000 non-null   int64  
 19  touch_screen   1000 non-null   int64  
 20  wifi           1000 non-null   int64  
dtypes: float64(2), int64(19)
memory usage: 164.2 KB
```

In [7]:
```
x=train_df.drop('wifi',axis=1)
y=train_df['wifi']
```

In [8]:
```
x=test_df.drop('wifi',axis=1)
y=test_df['wifi']
```

In [9]:
```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,train_size=0.7,random_state=42)
x_train.shape,x_test.shape
```

Out[9]:
```
((700, 20), (300, 20))
```

In [10]:
```
from sklearn.ensemble import RandomForestClassifier
rfc=RandomForestClassifier()
rfc.fit(x_train,y_train)
```

Out[10]:
```
RandomForestClassifier
RandomForestClassifier()
```

In [11]:
```
rf=RandomForestClassifier()
```

In [12]:
```
params={'max_depth':[2,3,5,10,20],
       'min_samples_leaf':[5,10,20,50,100,200],
       'n_estimators':[10,25,30,50,100,200]}
```

In [13]:
```
from sklearn.model_selection import GridSearchCV
grid_search=GridSearchCV(estimator=rf,param_grid=params,cv=2,scoring='accuracy')
grid_search.fit(x_train,y_train)
```

Out[13]:
```
GridSearchCV
estimator: RandomForestClassifier
RandomForestClassifier
```

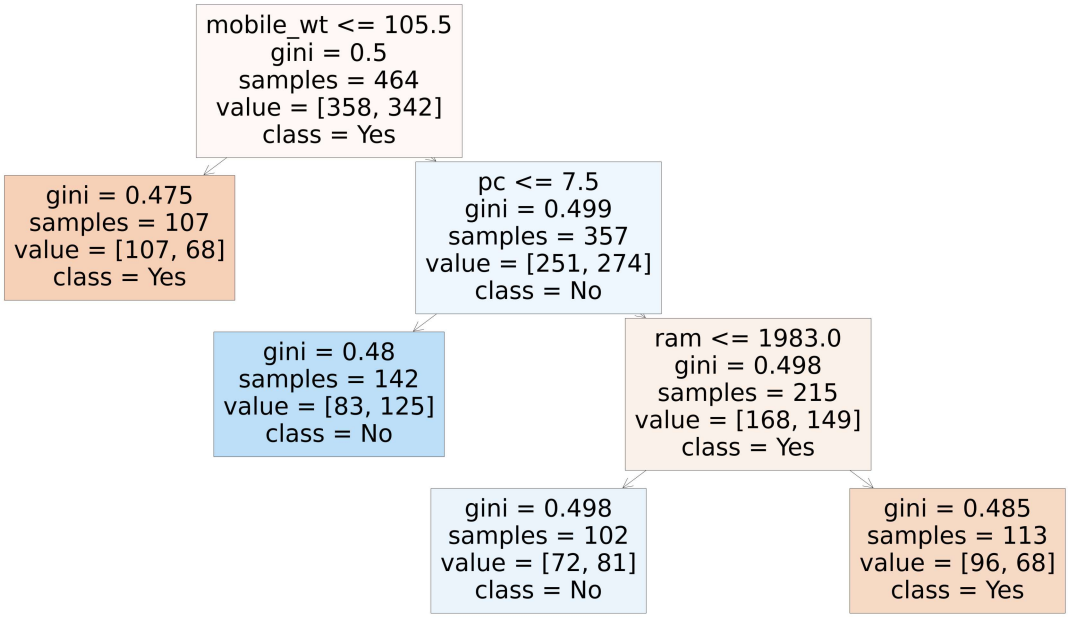
In [14]:
```
grid_search.best_score_
```

Out[14]:
```
0.5614285714285714
```

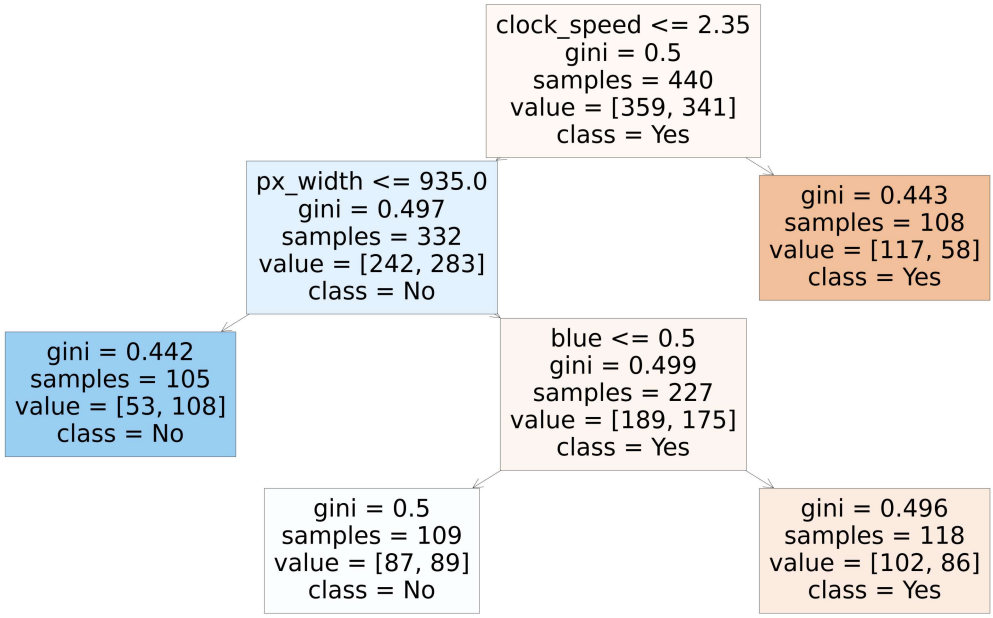
In [15]:
```
rf_best=grid_search.best_estimator_
print(rf_best)
```

```
RandomForestClassifier(max_depth=3, min_samples_leaf=100, n_estimators=200)
```

In [16]:
```
from sklearn.tree import plot_tree
plt.figure(figsize=(80,40))
plot_tree(rf_best.estimators_[5],feature_names=x.columns,class_names=['Yes','No'],filled=True)
```



In [17]:
```
from sklearn.tree import plot_tree
plt.figure(figsize=(80,40))
plot_tree(rf_best.estimators_[7],feature_names=x.columns,class_names=['Yes','No'],filled=True)
```



In [18]:
```
rf_best.feature_importances_
```

Out[18]:
```
array([0.04582584, 0.07071127, 0.02287273, 0.11097868, 0.00939248,
       0.06616402, 0.02471583, 0.07045867, 0.06064414, 0.10247415,
       0.00616537, 0.04054562, 0.04776337, 0.13870076, 0.05979664,
       0.02660986, 0.04916749, 0.03959261, 0.        , 0.00742048])
```

In [19]:
```
imp_df=pd.DataFrame({'Varname':x_train.columns,"Imp":rf_best.feature_importances_})
imp_df.sort_values(by="Imp",ascending=False)
```

Out[19]:

	Varname	Imp
13	px_width	0.138701
3	clock_speed	0.110979
9	mobile_wt	0.102474
1	battery_power	0.070711
7	int_memory	0.070459
5	fc	0.066164
8	m_dep	0.060644
14	ram	0.059797
16	sc_w	0.049167
12	px_height	0.047763
0	id	0.045826
11	pc	0.040546
17	talk_time	0.039593
15	sc_h	0.026610
6	four_g	0.024716
2	blue	0.022873
4	dual_sim	0.009392
19	touch_screen	0.007420
10	n_cores	0.006165
18	three_g	0.000000

In [ ]:
```

```