RANDOM FOREST - 10

In [64]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [65]:

```
df=pd.read_csv(r"C:\Users\BHOOMISH\Downloads\C10_loan1.csv")
df
```

Out[65]:

	Home Owner	Marital Status	Annual Income	Defaulted Borrower
0	Yes	Single	125	No
1	No	Married	100	No
2	No	Single	70	No
3	Yes	Married	120	No
4	No	Divorced	95	Yes
5	No	Married	60	No
6	Yes	Divorced	220	No
7	No	Single	85	Yes
8	No	Married	75	No
9	No	Single	90	Yes

In [66]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 10 entries, 0 to 9
Data columns (total 4 columns):
 #   Column             Non-Null Count  Dtype 
---  ------             --------------  ----- 
 0   Home Owner         10 non-null     object
 1   Marital Status     10 non-null     object
 2   Annual Income      10 non-null     int64 
 3   Defaulted Borrower  10 non-null     object
dtypes: int64(1), object(3)
memory usage: 448.0+ bytes
```

In [67]:
```
df.isnull().sum()
```

Out[67]:
```
Home Owner           0
Marital Status       0
Annual Income        0
Defaulted Borrower    0
dtype: int64
```

In [61]:
```
df.describe()
```

Out[61]:

	row_id	user_id	gate_id
count	37518.000000	37518.000000	37518.000000
mean	18758.500000	28.219015	6.819607
std	10830.658036	17.854464	3.197746
min	0.000000	0.000000	-1.000000
25%	9379.250000	12.000000	4.000000
50%	18758.500000	29.000000	6.000000
75%	28137.750000	47.000000	10.000000
max	37517.000000	57.000000	16.000000

```
In [62]: df.columns
```

```
Out[62]: Index(['row_id', 'user_id', 'timestamp', 'gate_id'], dtype='object')
```

In [63]:

```
df['user_id'].value_counts()
```

Out[63]:

```
37    2262
55    2238
6     2013
12    1953
19    1793
15    1756
18    1578
47    1341
53    1311
1     1299
33    1285
11    1281
49    1275
0     1250
39    1144
32    1076
54    1070
9     1034
50     994
29     990
3      989
48     743
14     696
17     677
27     603
35     601
46     502
57     497
24     416
42     359
26     316
34     284
23     261
25     247
40     242
31     191
56     137
41     124
43     124
20     115
22      96
28      64
45      57
```

```
7       49
36      48
2       39
8       29
10      17
38      13
5       10
30      10
52       5
21       5
44       4
51       3
4        2
Name: user_id, dtype: int64
```

In [ ]:

```
g1={"gate_id":{'6':1,'5':4}}
df=df.replace(g1)
print(df)
```

In [ ]:

```
x=df.drop("row_id",axis=1)
y=df["row_id"]
```

In [ ]:

```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,train_size=0.70)
```

In [ ]:

```
from sklearn.ensemble import RandomForestClassifier
rfc=RandomForestClassifier()
rfc.fit(x_train,y_train)
```

In [ ]:

```
parameters={'max_depth':[1,2,3,4,5],
            'min_samples_leaf':[5,10,15,20,25],
            'n_estimators':[10,20,30,40,50]}
```

In [ ]:

```
from sklearn.model_selection import GridSearchCV
grid_search=GridSearchCV(estimator=rfc,param_grid=parameters,cv=2,scoring="accuracy")
grid_search.fit(x_train,y_train)
```

In [ ]:

```
grid_search.best_score_
```

In [41]:

```
parameters={'max_depth':[1,2,3,4,5],
            'min_samples_leaf':[5,10,15,20,25],
            'n_estimators':[10,20,30,40,50]}
```

In [42]:

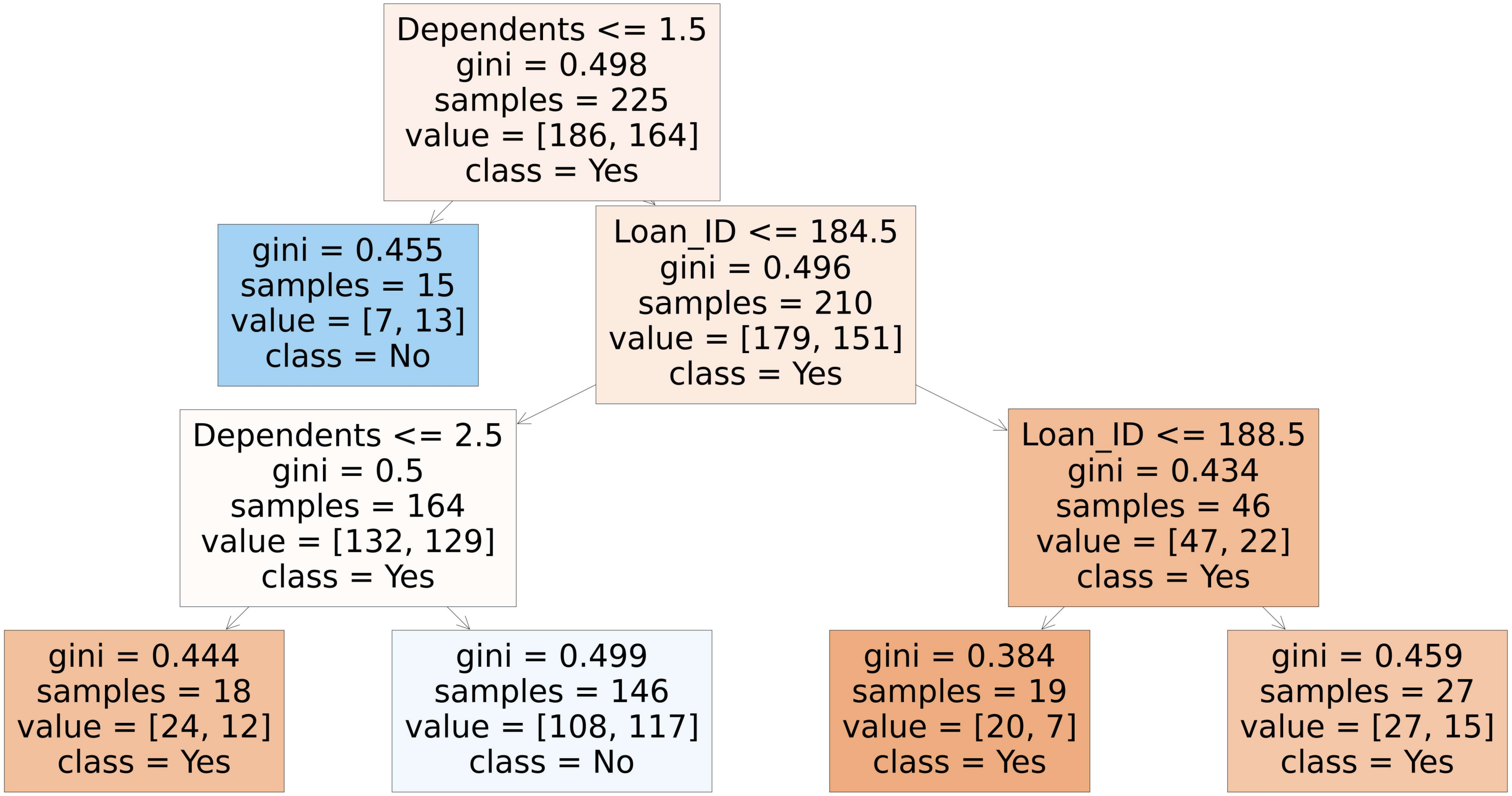
```
rfc_best=grid_search.best_estimator_
```

In [43]:

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

Out[43]:

```
[Text(0.375, 0.875, 'Dependents <= 1.5\ngini = 0.498\nsamples = 225\nvalue = [186, 164]\nclass = Yes'),
 Text(0.25, 0.625, 'gini = 0.455\nsamples = 15\nvalue = [7, 13]\nclass = No'),
 Text(0.5, 0.625, 'Loan_ID <= 184.5\ngini = 0.496\nsamples = 210\nvalue = [179, 151]\nclass = Yes'),
 Text(0.25, 0.375, 'Dependents <= 2.5\ngini = 0.5\nsamples = 164\nvalue = [132, 129]\nclass = Yes'),
 Text(0.125, 0.125, 'gini = 0.444\nsamples = 18\nvalue = [24, 12]\nclass = Yes'),
 Text(0.375, 0.125, 'gini = 0.499\nsamples = 146\nvalue = [108, 117]\nclass = No'),
 Text(0.75, 0.375, 'Loan_ID <= 188.5\ngini = 0.434\nsamples = 46\nvalue = [47, 22]\nclass = Yes'),
 Text(0.625, 0.125, 'gini = 0.384\nsamples = 19\nvalue = [20, 7]\nclass = Yes'),
 Text(0.875, 0.125, 'gini = 0.459\nsamples = 27\nvalue = [27, 15]\nclass = Yes')]
```



In [ ]: