In [1]:
```python
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:
```python
df=pd.read_csv(r"D:\Python_Dataset.csv")
df
```

Out[2]:

	Unnamed: 0	TV	Radio	Newspaper	Sales
0	1	230.1	37.8	69.2	22.1
1	2	44.5	39.3	45.1	10.4
2	3	17.2	45.9	69.3	9.3
3	4	151.5	41.3	58.5	18.5
4	5	180.8	10.8	58.4	12.9
...	...	...	...	...	...
195	196	38.2	3.7	13.8	7.6
196	197	94.2	4.9	8.1	9.7
197	198	177.0	9.3	6.4	12.8
198	199	283.6	42.0	66.2	25.5
199	200	232.1	8.6	8.7	13.4

200 rows × 5 columns

In [3]:
```python
df.shape
```

Out[3]:
```
(200, 5)
```

In [4]:
```python
df.head(5)
```

Out[4]:

	Unnamed: 0	TV	Radio	Newspaper	Sales
0	1	230.1	37.8	69.2	22.1
1	2	44.5	39.3	45.1	10.4
2	3	17.2	45.9	69.3	9.3
3	4	151.5	41.3	58.5	18.5
4	5	180.8	10.8	58.4	12.9

In [5]:
```python
df.tail(3)
```

Out[5]:

	Unnamed: 0	TV	Radio	Newspaper	Sales
197	198	177.0	9.3	6.4	12.8
198	199	283.6	42.0	66.2	25.5
199	200	232.1	8.6	8.7	13.4

In [6]:
```python
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 200 entries, 0 to 199
Data columns (total 5 columns):
 #   Column      Non-Null Count  Dtype  
---  ------      --------------  -----  
 0   Unnamed: 0  200 non-null    int64  
 1   TV          200 non-null    float64
 2   Radio       200 non-null    float64
 3   Newspaper   200 non-null    float64
 4   Sales       200 non-null    float64
dtypes: float64(4), int64(1)
memory usage: 7.9 KB
```

In [7]:
```python
df.isnull().sum()
```

Out[7]:
```
Unnamed: 0    0
TV            0
Radio         0
Newspaper     0
Sales         0
dtype: int64
```

In [8]:
```python
df.describe
```

Out[8]:
```
<bound method NDFrame.describe of      Unnamed: 0     TV  Radio  Newspaper  Sales
0             1  230.1   37.8       69.2   22.1
1             2   44.5   39.3       45.1   10.4
2             3   17.2   45.9       69.3    9.3
3             4  151.5   41.3       58.5   18.5
4             5  180.8   10.8       58.4   12.9
..          ...    ...    ...        ...    ...
195         196   38.2    3.7       13.8    7.6
196         197   94.2    4.9        8.1    9.7
197         198  177.0    9.3        6.4   12.8
198         199  283.6   42.0       66.2   25.5
199         200  232.1    8.6        8.7   13.4

[200 rows x 5 columns]>
```

In [9]:
```python
df.describe()
```

Out[9]:

	Unnamed: 0	TV	Radio	Newspaper	Sales
count	200.000000	200.000000	200.000000	200.000000	200.000000
mean	100.500000	147.042500	23.264000	30.554000	14.022500
std	57.879185	85.854236	14.846809	21.778621	5.217457
min	1.000000	0.700000	0.000000	0.300000	1.600000
25%	50.750000	74.375000	9.975000	12.750000	10.375000
50%	100.500000	149.750000	22.900000	25.750000	12.900000
75%	150.250000	218.825000	36.525000	45.100000	17.400000
max	200.000000	296.400000	49.600000	114.000000	27.000000

In [10]:
```python
df.columns
```

Out[10]:
```
Index(['Unnamed: 0', 'TV', 'Radio', 'Newspaper', 'Sales'], dtype='object')
```

In [11]:
```python
list(df)
```

Out[11]:
```
['Unnamed: 0', 'TV', 'Radio', 'Newspaper', 'Sales']
```

In [12]:
```python
df.TV.value_counts()
```

Out[12]:
```
199.8    2
109.8    2
17.2     2
177.0    2
222.4    2
        ..
139.3    1
216.8    1
199.1    1
26.8     1
232.1    1
Name: TV, Length: 190, dtype: int64
```

In [13]:
```python
df.Radio.value_counts()
```

Out[13]:
```
4.1     3
5.7     3
13.9    2
14.3    2
36.9    2
       ..
42.8    1
14.5    1
30.6    1
33.0    1
8.6     1
Name: Radio, Length: 167, dtype: int64
```

In [14]:
```python
df.Newspaper.value_counts()
```

Out[14]:
```
9.3     3
25.6    3
8.7     3
34.6    2
8.5     2
       ..
27.2    1
31.7    1
19.3    1
31.3    1
66.2    1
Name: Newspaper, Length: 172, dtype: int64
```

In [15]:
```python
df.Sales.value_counts()
```

Out[15]:
```
9.7     5
11.7    4
12.9    4
15.9    4
20.7    3
       ..
17.0    1
18.3    1
22.3    1
14.0    1
25.5    1
Name: Sales, Length: 121, dtype: int64
```

In [16]:
```python
print('Missing Values:')
df.isnull().sum()
```

Out[16]:
```
Missing Values:
Unnamed: 0    0
TV            0
Radio         0
Newspaper     0
Sales         0
dtype: int64
```

In [17]:
```python
print(" Data types of columns:")
print(df.dtypes)
```

```
 Data types of columns:
Unnamed: 0      int64
TV            float64
Radio         float64
Newspaper     float64
Sales         float64
dtype: object
```

In [18]:
```python
df = df.drop_duplicates()
df.duplicated().sum()
```

Out[18]:
```
0
```

In [20]:
```python
df.drop_duplicates()
```

Out[20]:

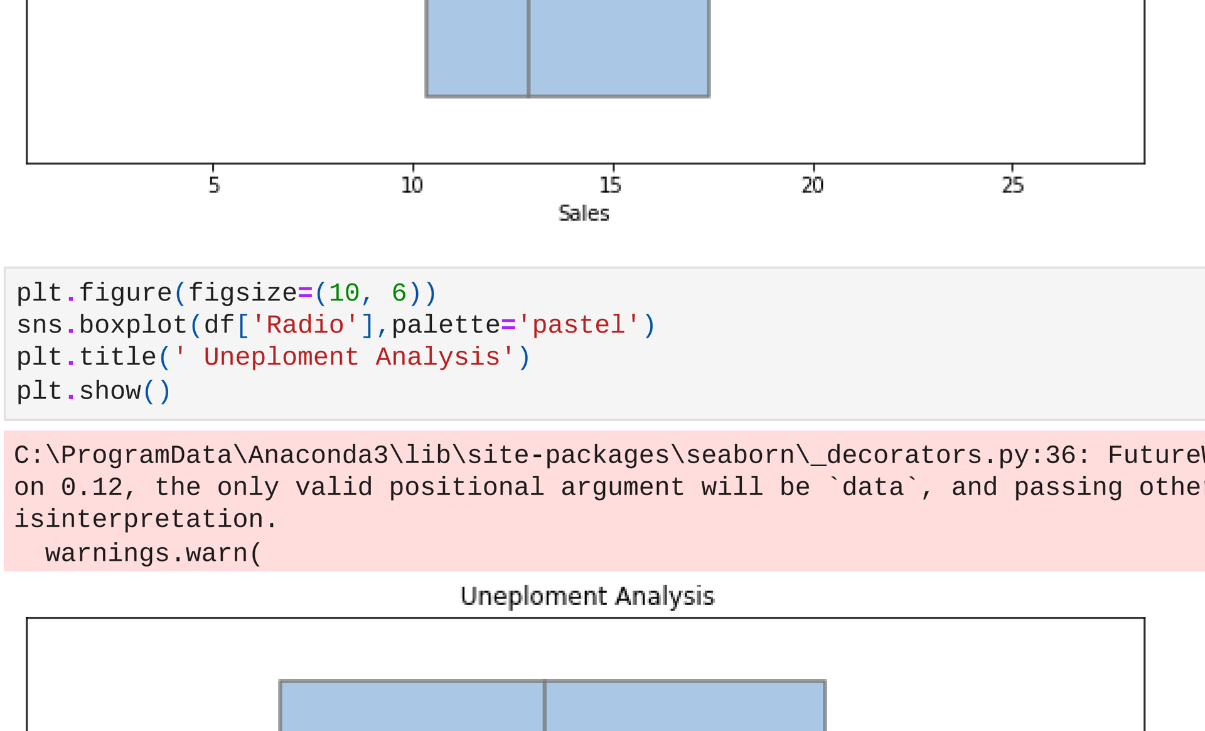
	Unnamed: 0	TV	Radio	Newspaper	Sales
0	1	230.1	37.8	69.2	22.1
1	2	44.5	39.3	45.1	10.4
2	3	17.2	45.9	69.3	9.3
3	4	151.5	41.3	58.5	18.5
4	5	180.8	10.8	58.4	12.9
...	...	...	...	...	...
195	196	38.2	3.7	13.8	7.6
196	197	94.2	4.9	8.1	9.7
197	198	177.0	9.3	6.4	12.8
198	199	283.6	42.0	66.2	25.5
199	200	232.1	8.6	8.7	13.4

200 rows × 5 columns

Data visualization and EDA

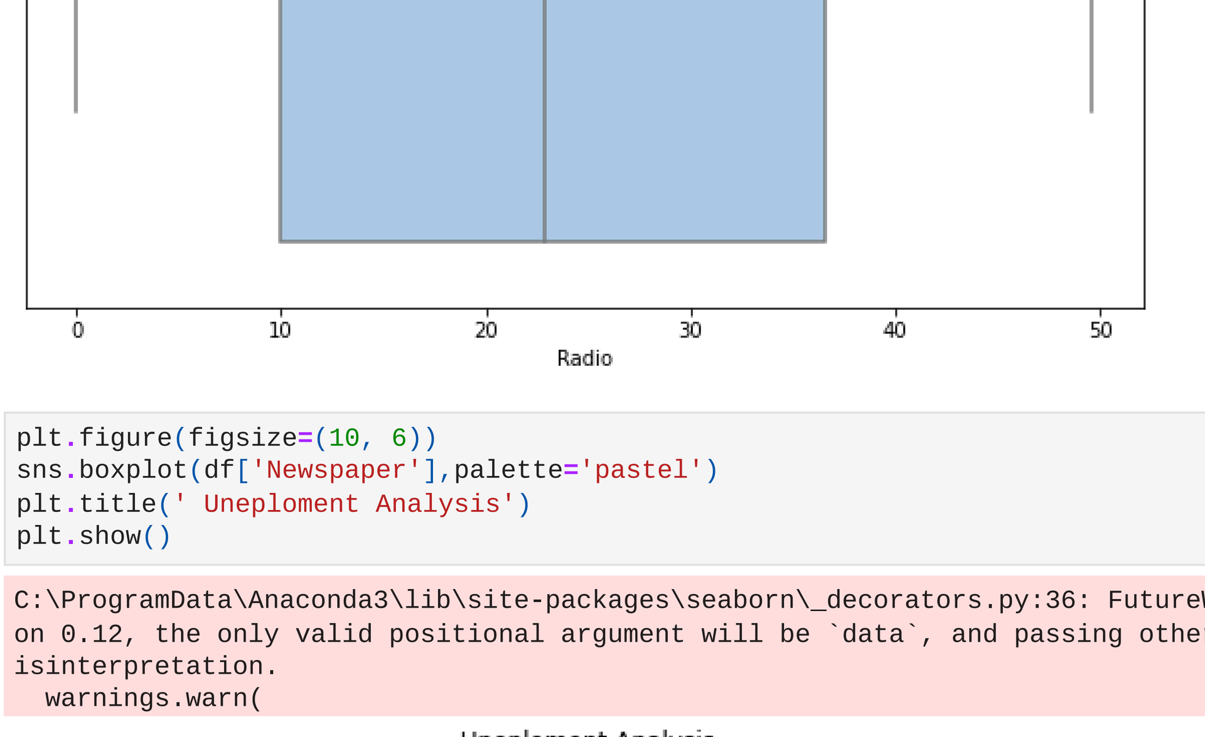
In [21]:
```python
plt.figure(figsize=(10, 6))
sns.boxplot(df['Sales'],palette='pastel')
plt.title(' Uneploment Analysis')
plt.show()
```

```
C:\ProgramData\Anaconda3\lib\site-packages\seaborn\_decorators.py:36: FutureWarning: Pass the following variable as a keyword arg: x. From versi
on 0.12, the only valid positional argument will be `data`, and passing other arguments without an explicit keyword will result in an error or m
isinterpretation.
  warnings.warn(
```



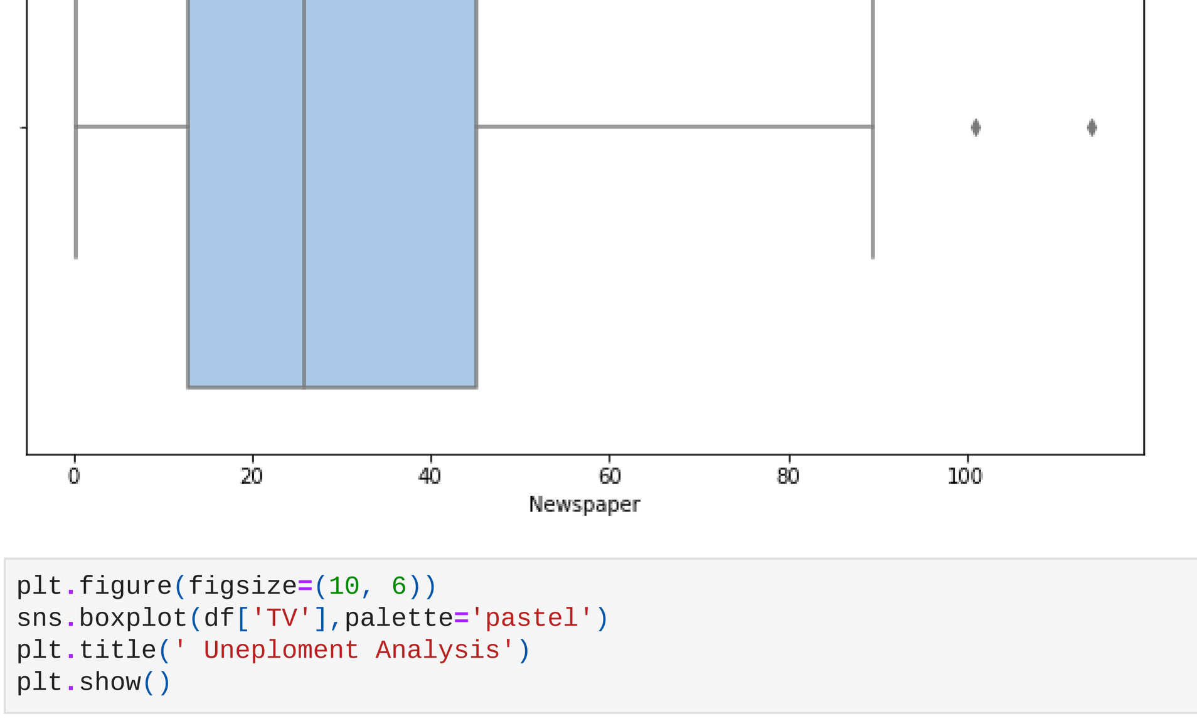
In [23]:
```python
plt.figure(figsize=(10, 6))
sns.boxplot(df['Radio'],palette='pastel')
plt.title(' Uneploment Analysis')
plt.show()
```

```
C:\ProgramData\Anaconda3\lib\site-packages\seaborn\_decorators.py:36: FutureWarning: Pass the following variable as a keyword arg: x. From versi
on 0.12, the only valid positional argument will be `data`, and passing other arguments without an explicit keyword will result in an error or m
isinterpretation.
  warnings.warn(
```



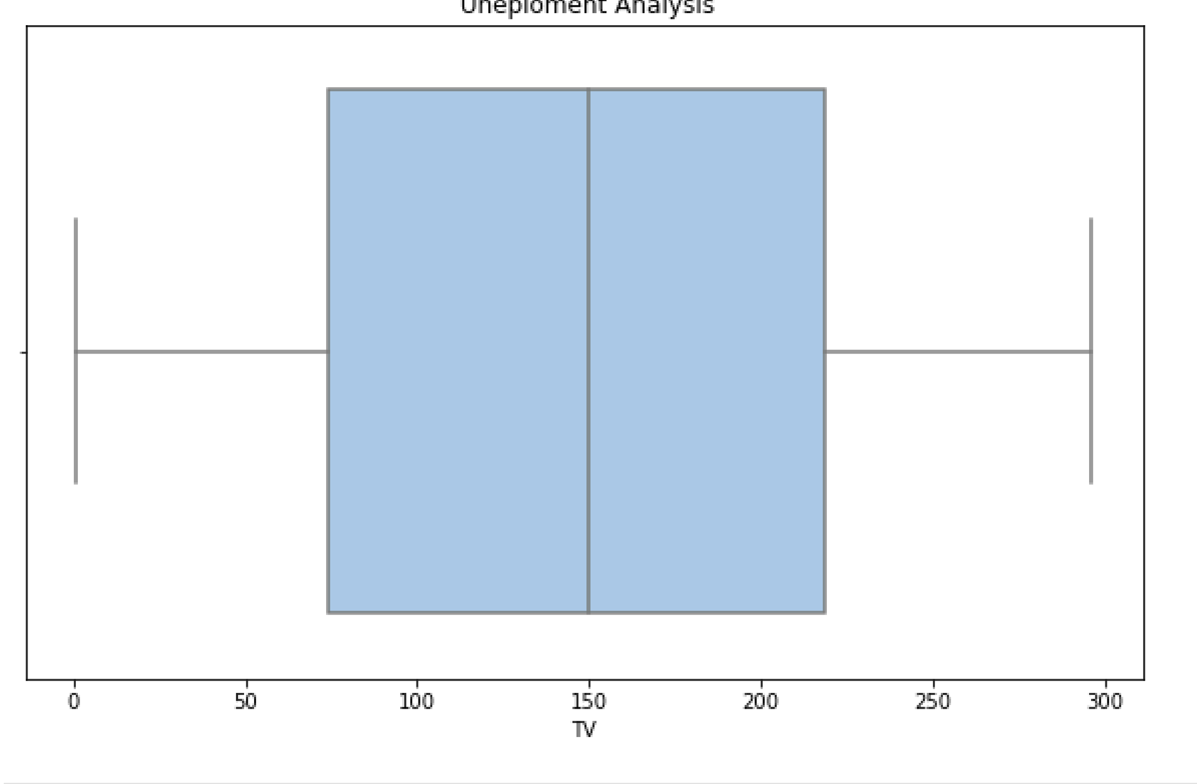
In [24]:
```python
plt.figure(figsize=(10, 6))
sns.boxplot(df['Newspaper'],palette='pastel')
plt.title(' Uneploment Analysis')
plt.show()
```

```
C:\ProgramData\Anaconda3\lib\site-packages\seaborn\_decorators.py:36: FutureWarning: Pass the following variable as a keyword arg: x. From versi
on 0.12, the only valid positional argument will be `data`, and passing other arguments without an explicit keyword will result in an error or m
isinterpretation.
  warnings.warn(
```



In [25]:
```python
plt.figure(figsize=(10, 6))
sns.boxplot(df['TV'],palette='pastel')
plt.title(' Uneploment Analysis')
plt.show()
```

```
C:\ProgramData\Anaconda3\lib\site-packages\seaborn\_decorators.py:36: FutureWarning: Pass the following variable as a keyword arg: x. From versi
on 0.12, the only valid positional argument will be `data`, and passing other arguments without an explicit keyword will result in an error or m
isinterpretation.
  warnings.warn(
```



In [ ]:

In [ ]: