Titanic EDA Template

Task 5 — Exploratory Data Analysis (EDA)

This notebook is a ready-to-use template for your Task 5 (Titanic dataset). It uses `seaborn`'s built-in Titanic dataset for convenience (`sns.load_dataset('titanic')`) so you can run it without downloading files. If you prefer to use Kaggle's `train.csv`, replace the data-loading cell accordingly.

How to use:

1. Open this notebook in Jupyter or Google Colab.
2. Run each cell sequentially.
3. Add your observations in the markdown placeholders after each visualization.
4. Save the notebook and export to PDF for submission.

> Notebook created for: Task 5 — Exploratory Data Analysis (Titanic)

```
# 1. Imports
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline

# Set visualization defaults (you can modify if needed)
sns.set(style='whitegrid')
plt.rcParams['figure.figsize'] = (8,5)
```

```
# 2. Load the Titanic dataset (seaborn built-in).
# If you have 'train.csv' from Kaggle, use: pd.read_csv('train.csv')
df = sns.load_dataset('titanic')
df_original = df.copy()  # keep a copy of original data
df.head()
```

	survived	pclass	sex	age	sibsp	parch	fare	embarked	class	who
0	0	3	male	22.0	1	0	7.2500	S	Third	mar
1	1	1	female	38.0	1	0	71.2833	C	First	womar
2	1	3	female	26.0	0	0	7.9250	S	Third	womar
3	1	1	female	35.0	1	0	53.1000	S	First	womar
4	0	3	male	35.0	0	0	8.0500	S	Third	mar

Next steps: Generate code with df | New interactive sheet

```
# 3. Basic exploration
print('Shape:', df.shape)
print('\nInfo:')
df.info()
print('\n\nDescribe (numeric columns):')
display(df.describe(include=[np.number]).T)
print('\n\nDescribe (object/category columns):')
display(df.describe(include=['object','category']).T)
```

```
Shape: (891, 15)

Info:
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 891 entries, 0 to 890
Data columns (total 15 columns):
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
 0   survived     891 non-null    int64
 1   pclass       891 non-null    int64
 2   sex          891 non-null    object
 3   age          714 non-null    float64
 4   sibsp        891 non-null    int64
 5   parch        891 non-null    int64
 6   fare         891 non-null    float64
 7   embarked     889 non-null    object
 8   class        891 non-null    category
 9   who          891 non-null    object
 10  adult_male   891 non-null    bool
 11  deck         203 non-null    category
 12  embark_town  889 non-null    object
 13  alive        891 non-null    object
 14  alone        891 non-null    bool
dtypes: bool(2), category(2), float64(2), int64(4), object(5)
memory usage: 80.7+ KB


Describe (numeric columns):
```

	count	mean	std	min	25%	50%	75%	max
survived	891.0	0.383838	0.486592	0.00	0.0000	0.0000	1.0	1.0000
pclass	891.0	2.308642	0.836071	1.00	2.0000	3.0000	3.0	3.0000
age	714.0	29.699118	14.526497	0.42	20.1250	28.0000	38.0	80.0000
sibsp	891.0	0.523008	1.102743	0.00	0.0000	0.0000	1.0	8.0000
parch	891.0	0.381594	0.806057	0.00	0.0000	0.0000	0.0	6.0000
fare	891.0	32.204208	49.693429	0.00	7.9104	14.4542	31.0	512.3292

Describe (object/category columns):

	count	unique	top	freq
sex	891	2	male	577
embarked	889	3	S	644
class	891	3	Third	491
who	891	3	man	537
deck	203	7	C	59
embark_town	889	3	Southampton	644
alive	891	2	no	549

```
# 4. Missing values & value counts
missing = df.isnull().sum().sort_values(ascending=False)
display(missing[missing>0])

# Example: value counts for key categorical columns
for col in ['sex','class','embark_town','who','alone']:
    if col in df.columns:
        print('\nValue counts for', col)
        display(df[col].value_counts(dropna=False))
```

	0
deck	688
age	177
embarked	2
embark_town	2

dtype: int64

```
Value counts for sex
```

	count
sex	
male	577
female	314

dtype: int64

```
Value counts for class
```

	count
class	
Third	491

Data cleaning suggestions

- Handle missing values (e.g., `age`, `embarked`, `deck`).
- Consider imputing `age` (median or model-based), or create an `age_missing` flag.
- Drop or fill `deck` or create 'HasDeck' boolean if useful.
- Convert categorical columns to `category` dtype if needed.

(Add your chosen cleaning steps in the code cell below.)

```
# 5. Example cleaning (copy/modify as needed)
df_clean = df.copy()

# Simple imputation examples (modify based on your strategy)
if 'age' in df_clean.columns:
    df_clean['age_median'] = df_clean['age'].median()
    df_clean['age'] = df_clean['age'].fillna(df_clean['age_median'])

if 'embarked' in df_clean.columns:
    df_clean['embarked'] = df_clean['embarked'].fillna(df_clean['embarked'].

# Create useful features
if 'alone' in df_clean.columns:
    df_clean['is_alone'] = df_clean['alone'].map({True:1, False:0})

# Show counts after basic cleaning
df_clean.isnull().sum().sort_values(ascending=False).head(10)


Value counts for who
```

	count
who	
man	537
woman	271

	0
child	83
deck	688
embark_town	2
survived	0
pclass	0
sex	0
parch	0
fare	0
age	0
sibsp	0
class	0

dtype: int64

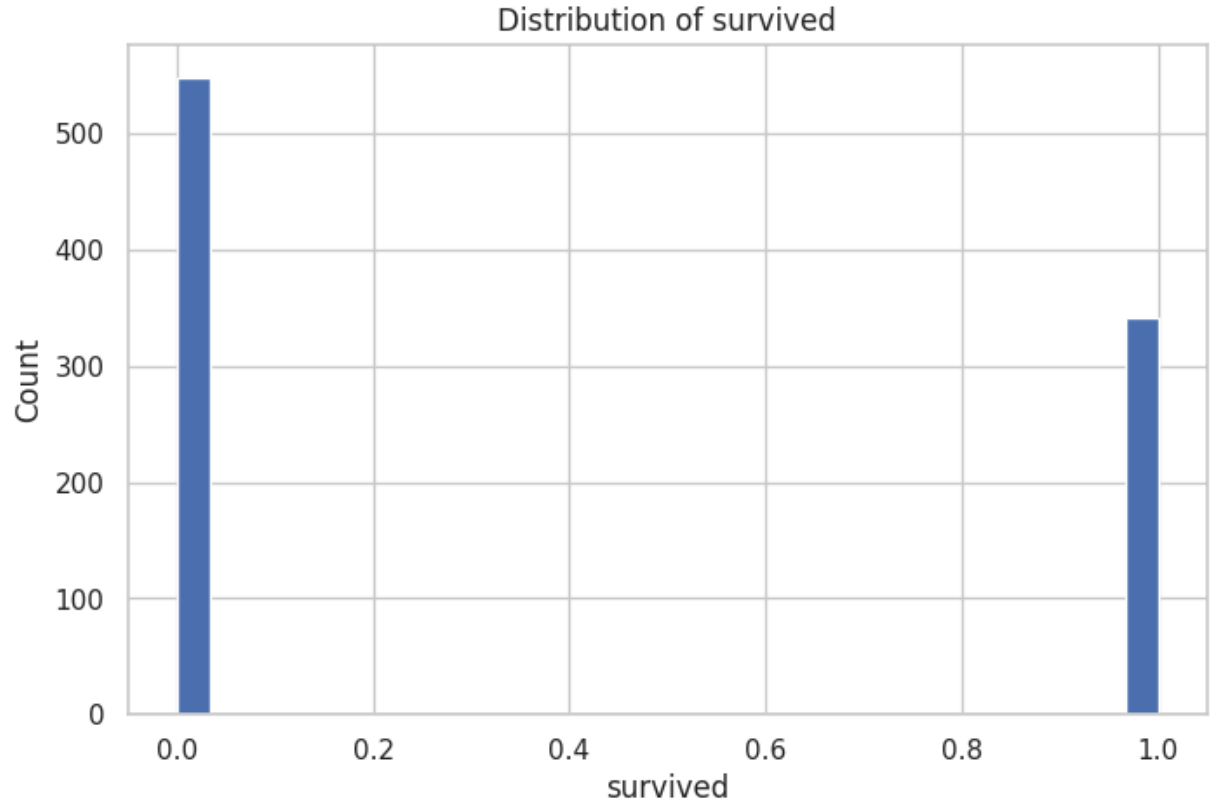
Verify data types and check for alone

alone
False 354

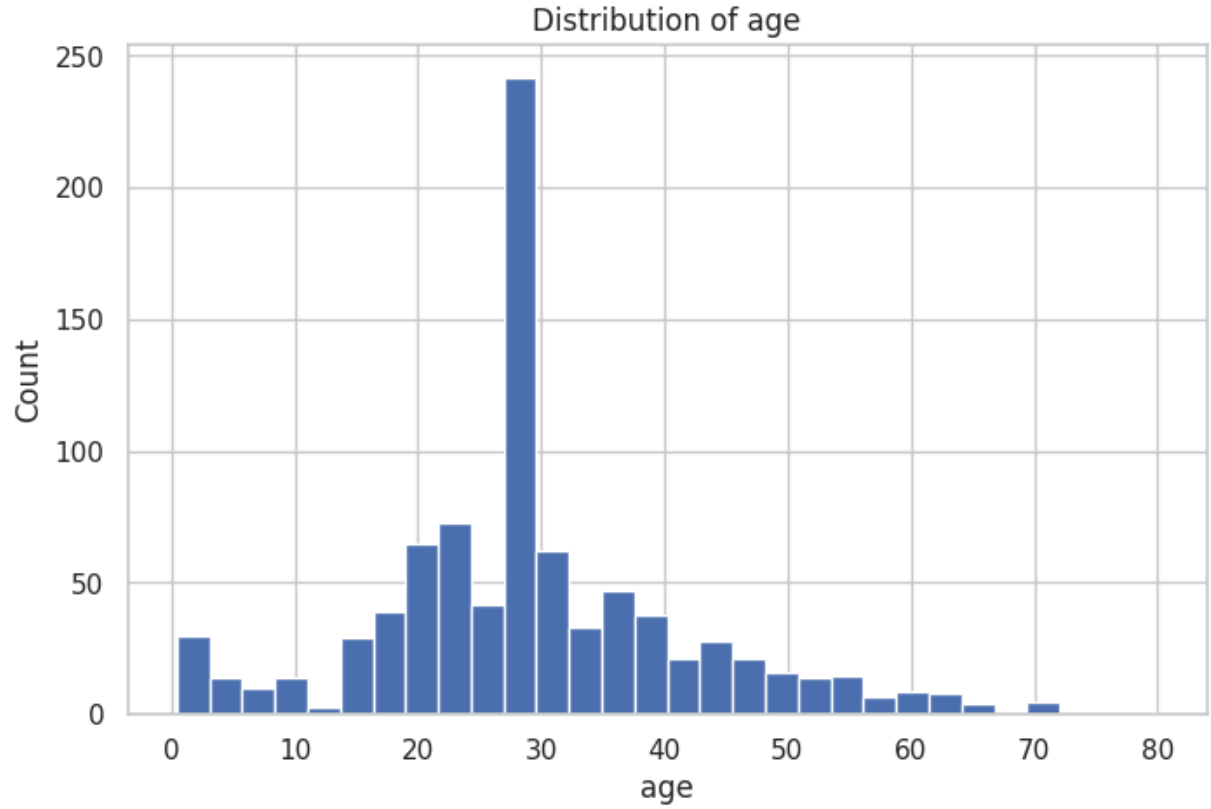
Univariate Analysis

Check distributions and outliers for numeric variables (histograms, boxplots). Add observations after each plot.

```
# 6. Histograms for numeric columns
numeric_cols = df_clean.select_dtypes(include=[np.number]).columns.tolist()
numeric_cols = [c for c in numeric_cols if c not in ['pclass']]  # example e
for col in numeric_cols:
    plt.figure()
    plt.hist(df_clean[col].dropna(), bins=30)
    plt.title(f'Distribution of {col}')
    plt.xlabel(col)
    plt.ylabel('Count')
    plt.show()
    print('\nObservation:  (add your notes here)\n---\n')
```




```
Observation:  (add your notes here)
---
```




```
Observation:  (add your notes here)
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```
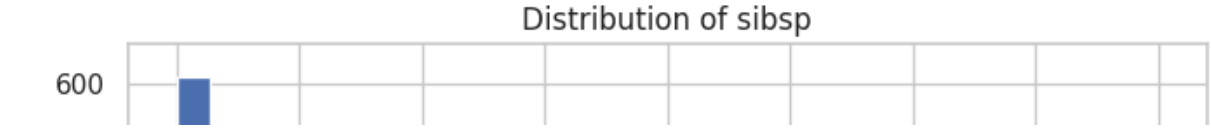
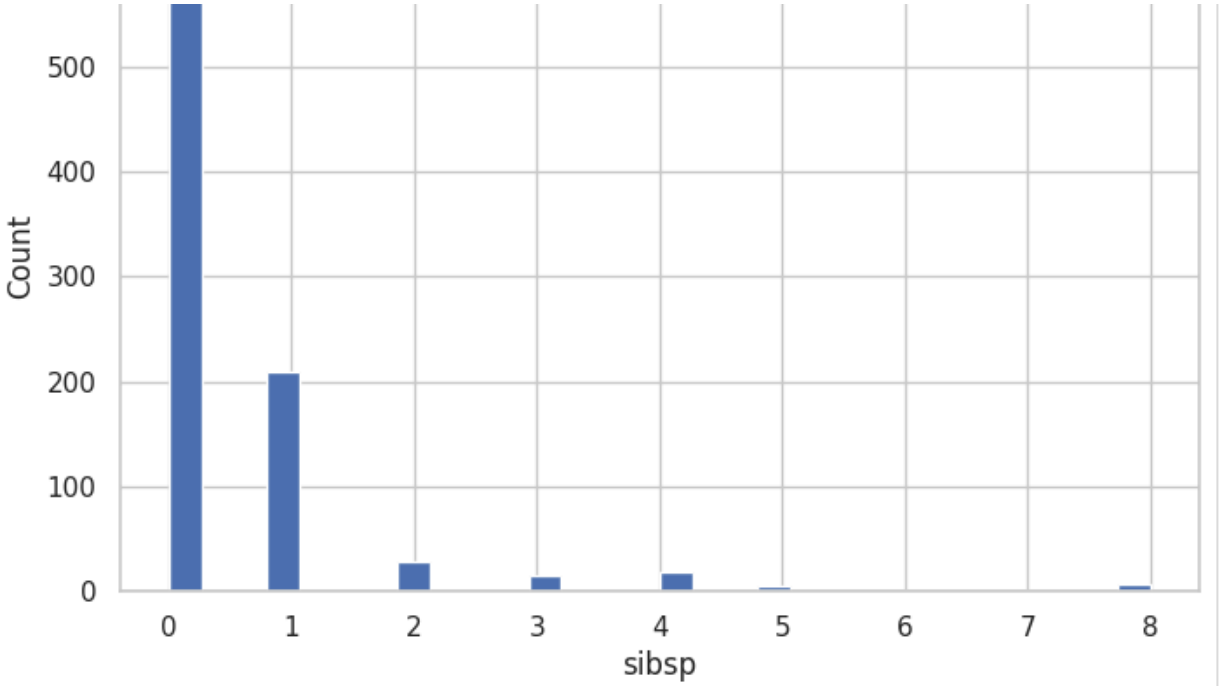
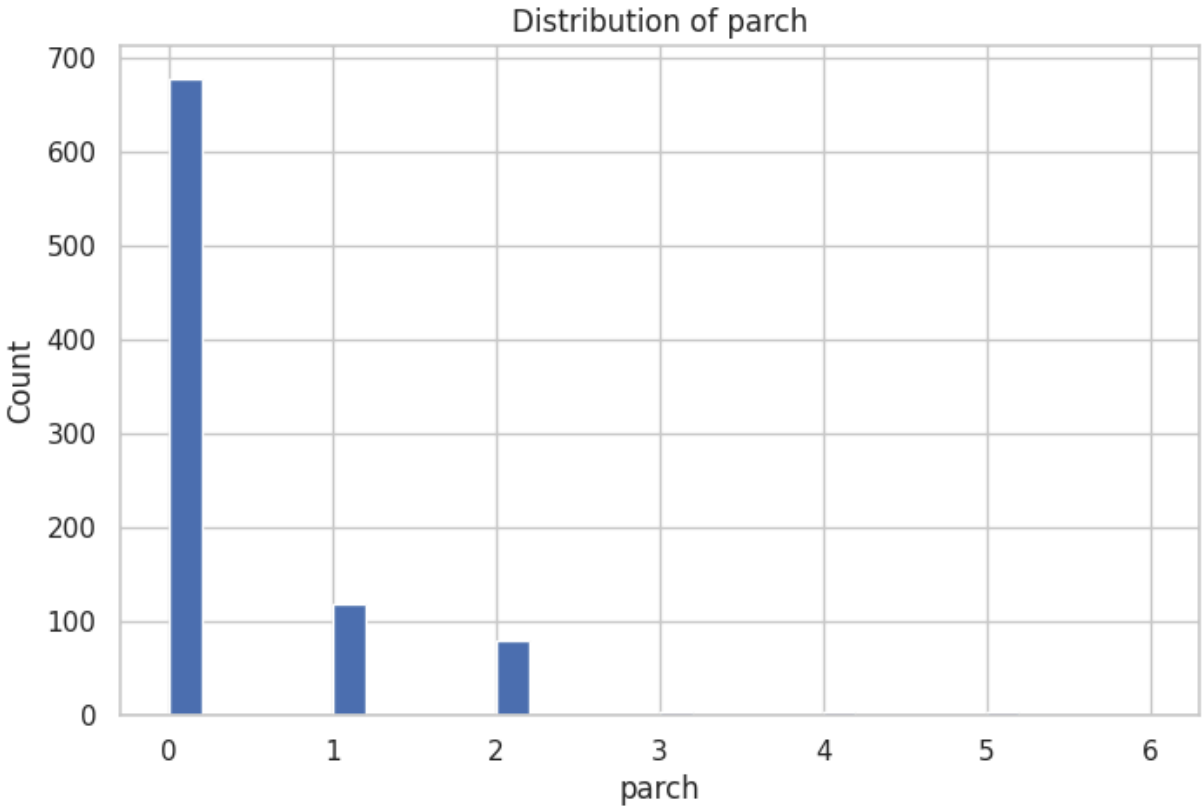
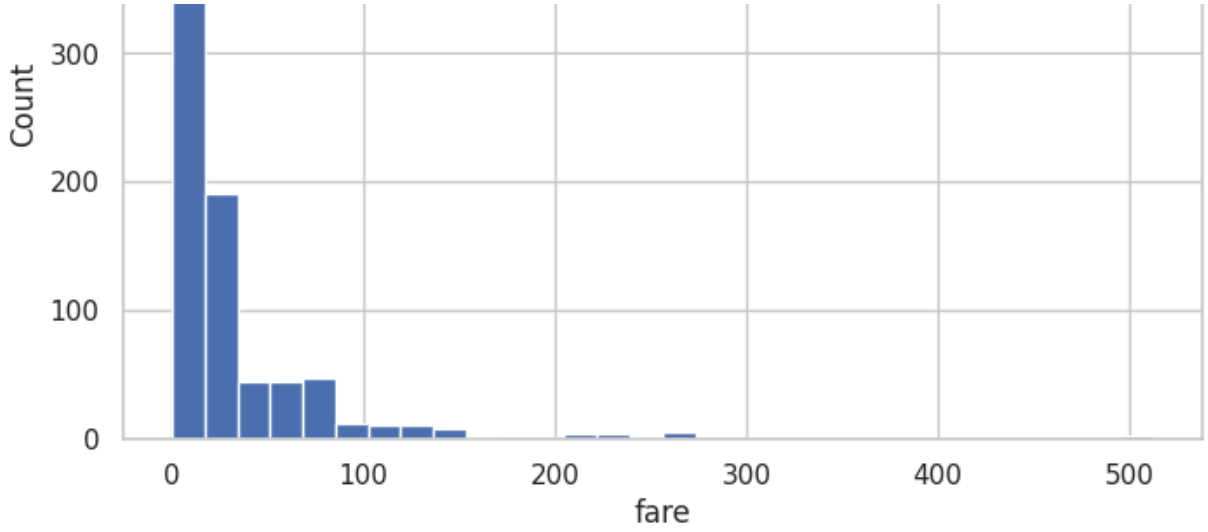





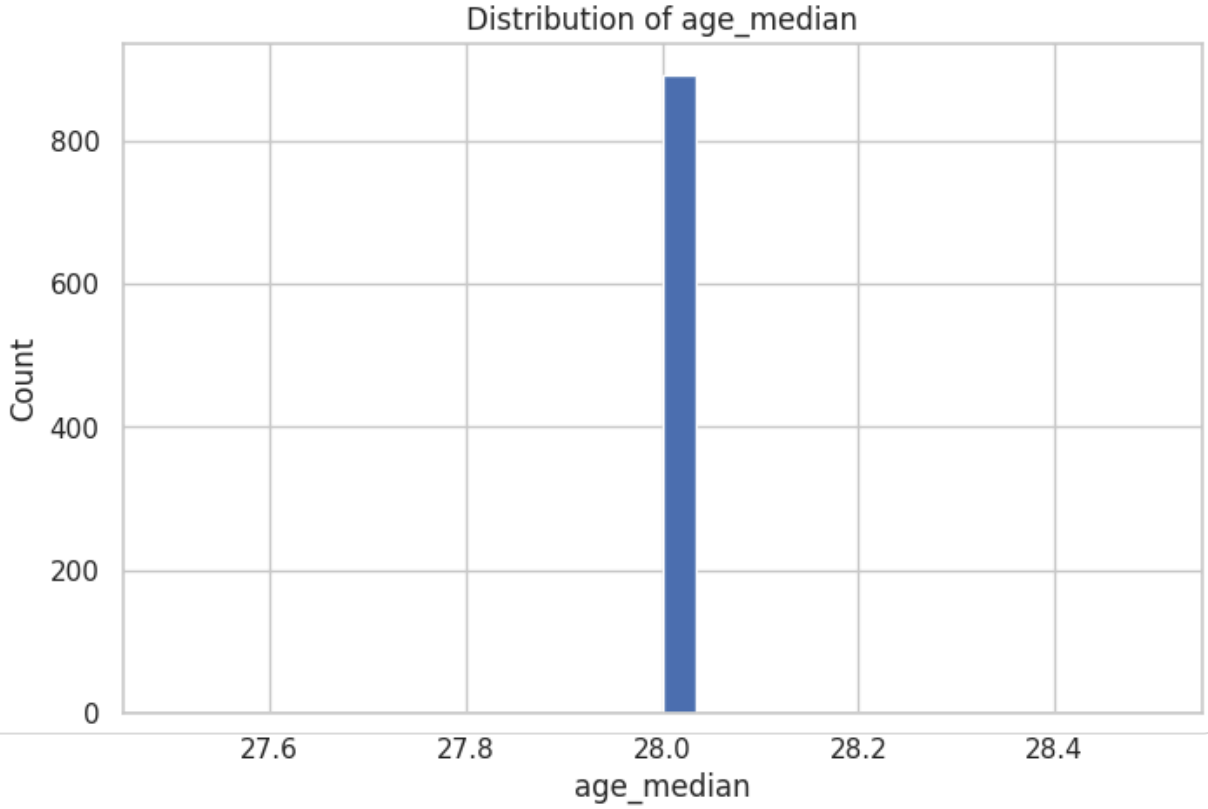
Observation: (add your notes here)



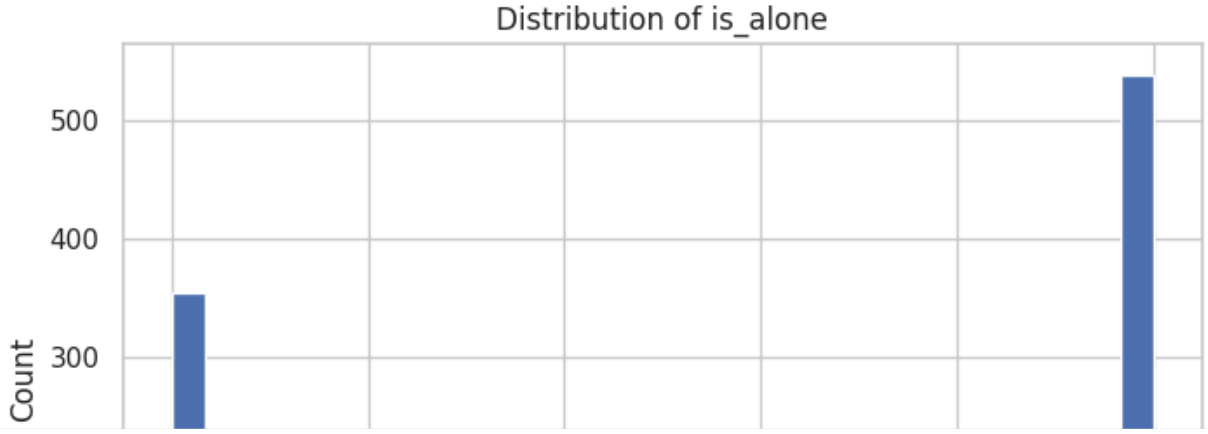
Observation: (add your notes here)



Observation: (add your notes here)



Observation: (add your notes here)



```
# 7. Boxplots (to check outliers)
for col in numeric_cols:
    plt.figure()
    plt.boxplot(df_clean[col].dropna(), vert=False)
    plt.title(f'Boxplot of {col}')
    plt.xlabel(col)
    plt.show()
    print('\nObservation:  (add your notes here)\n---\n')
```

```
Observation:  (add your notes here)
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```
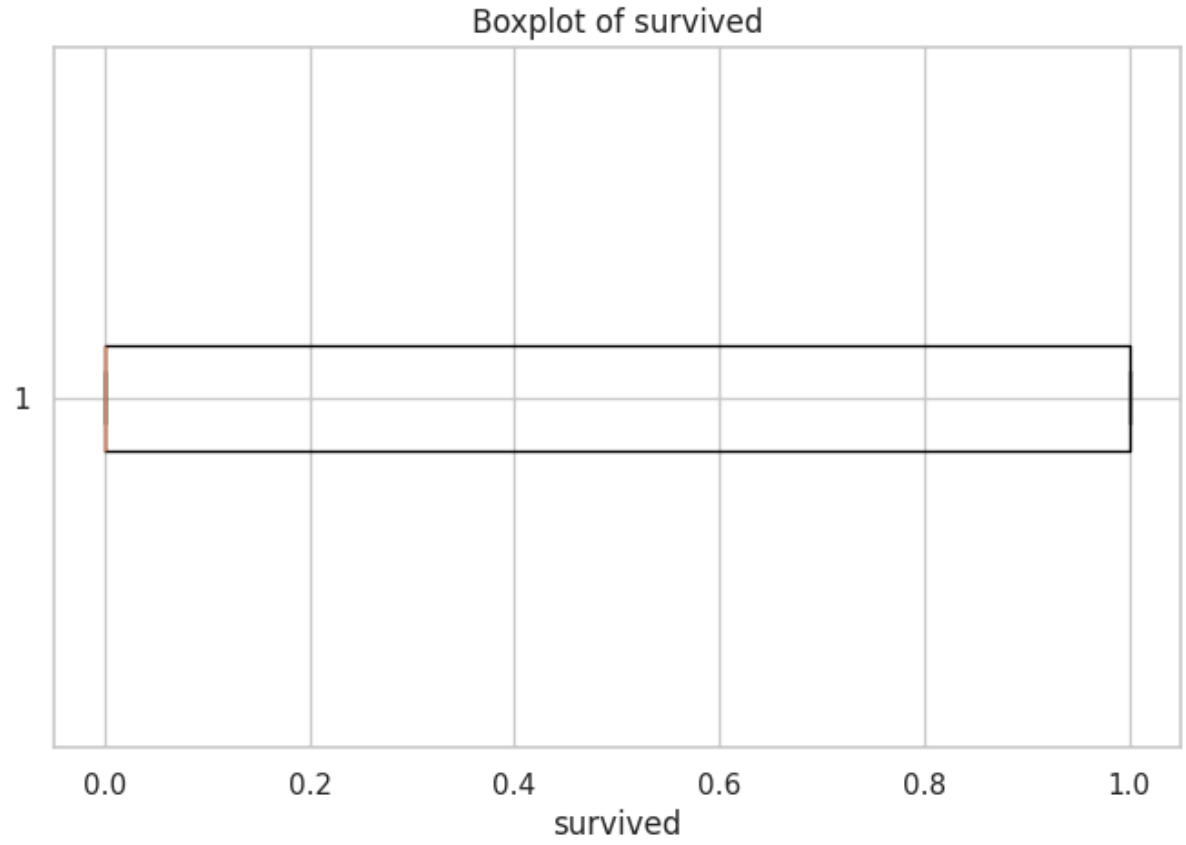
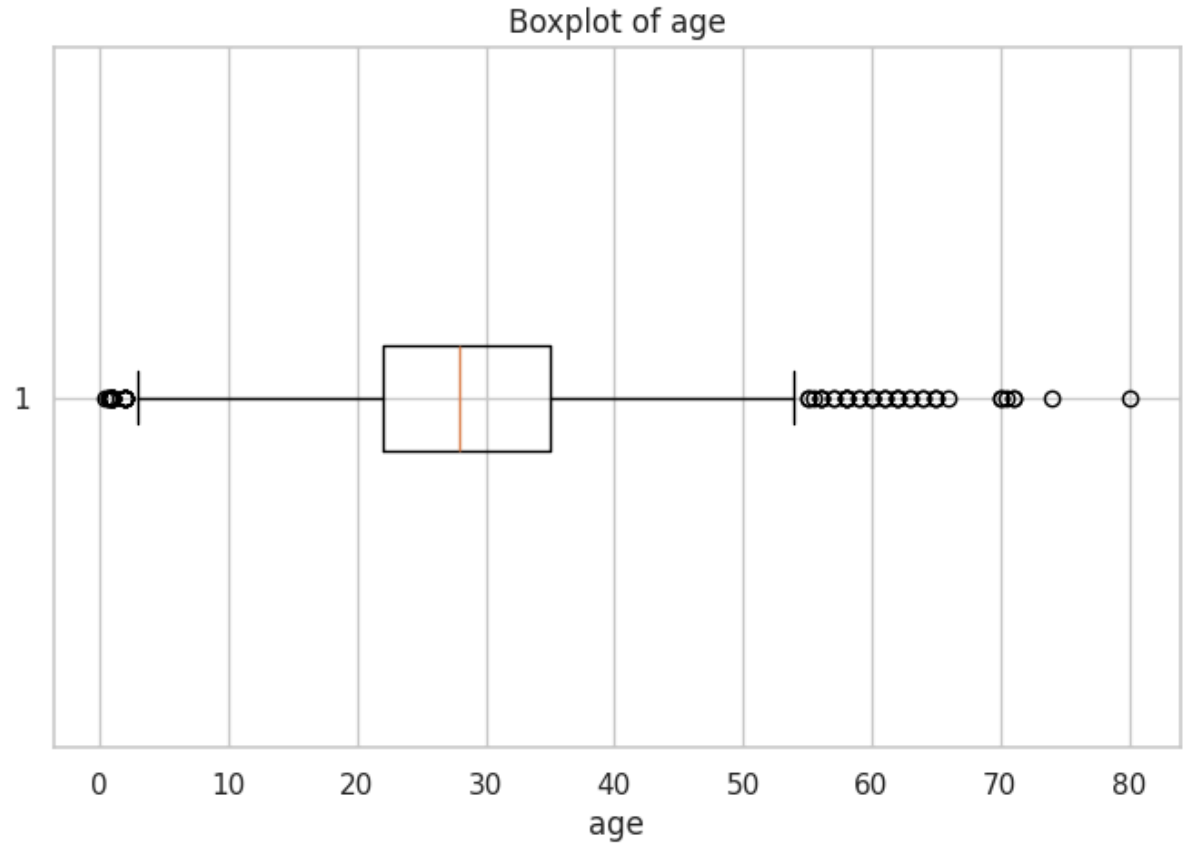
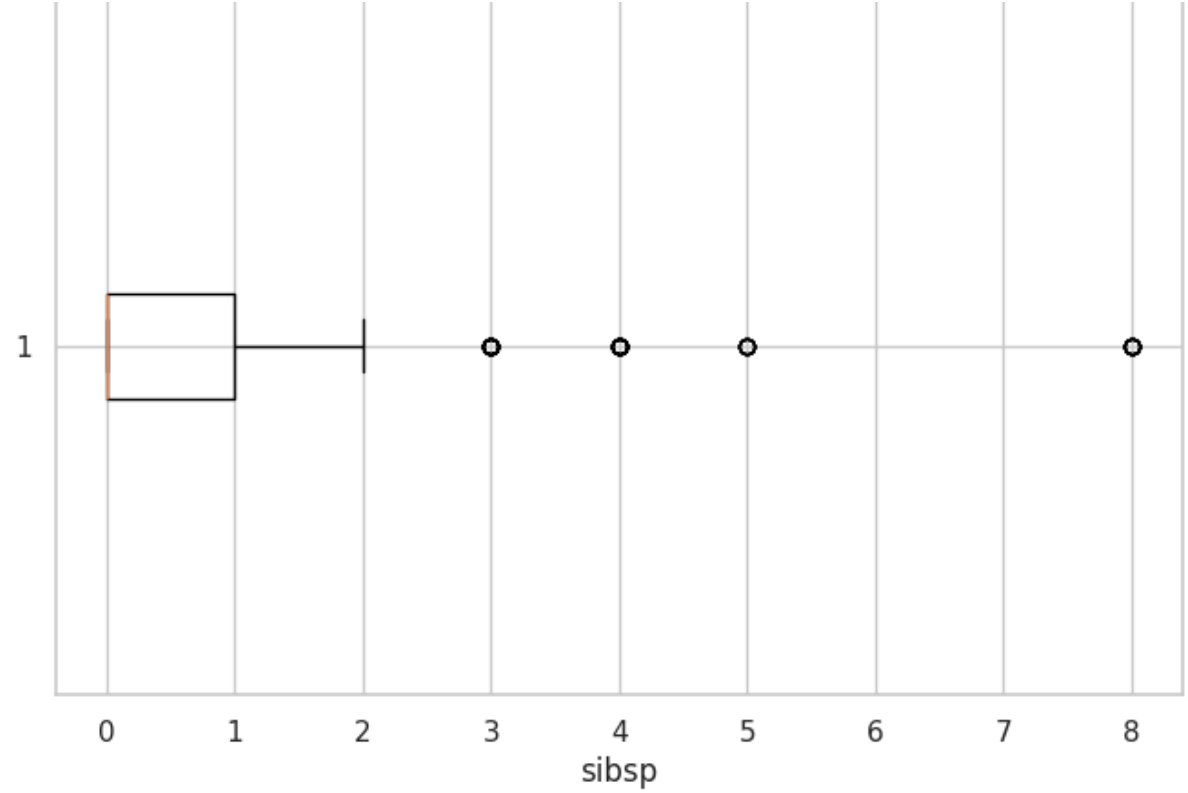



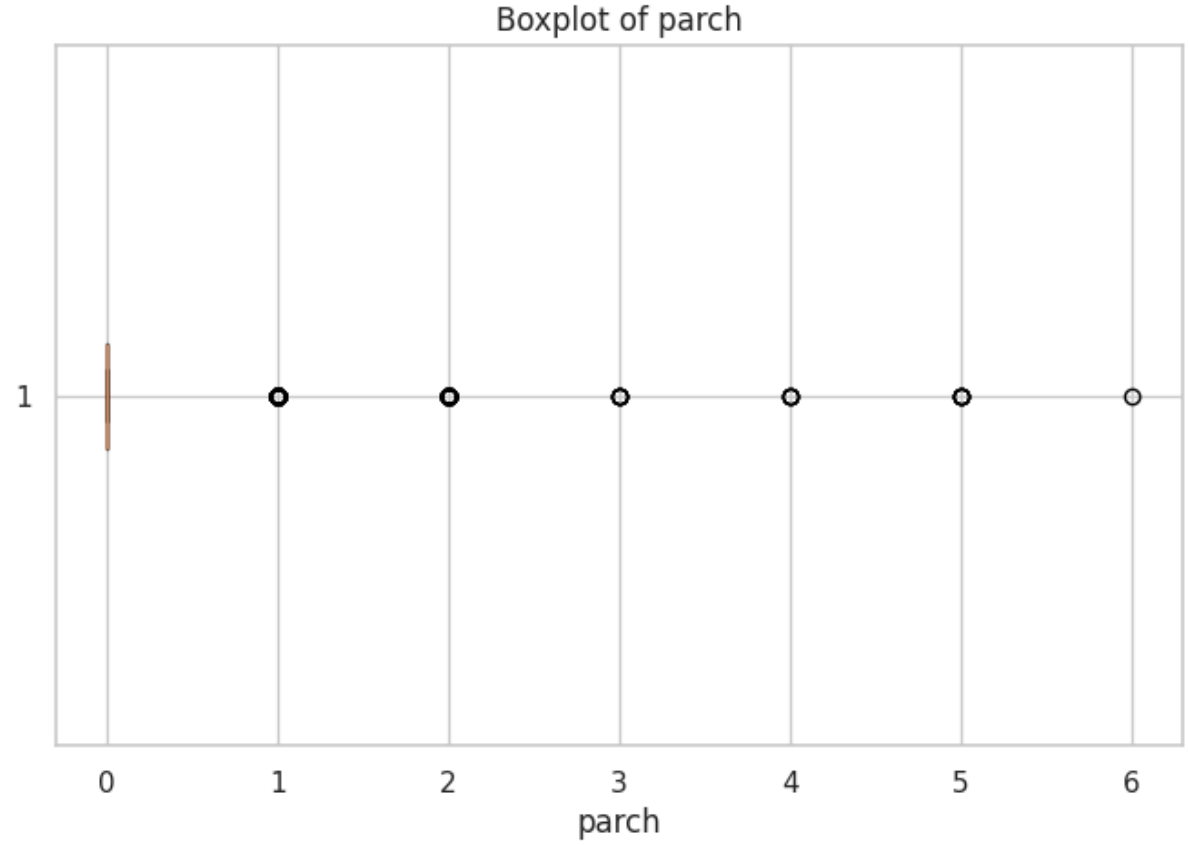
Observation: (add your notes here)



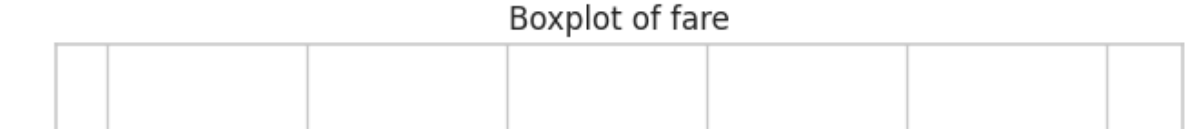
Observation: (add your notes here)

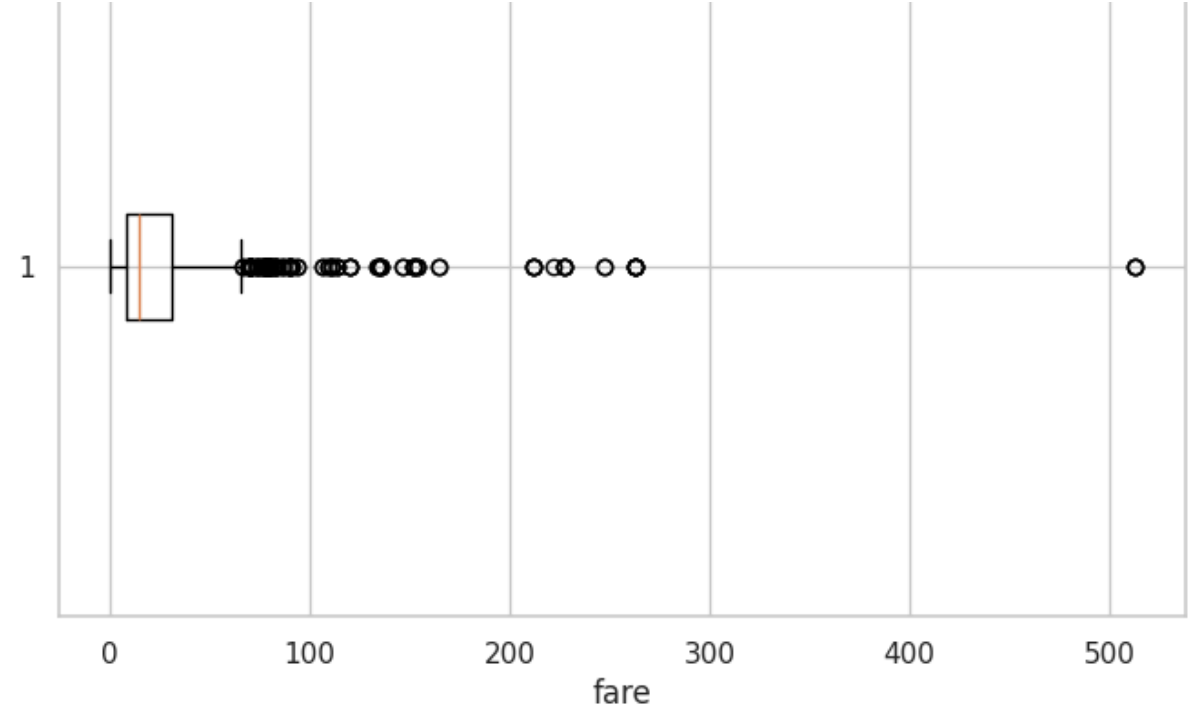


Observation: (add your notes here)

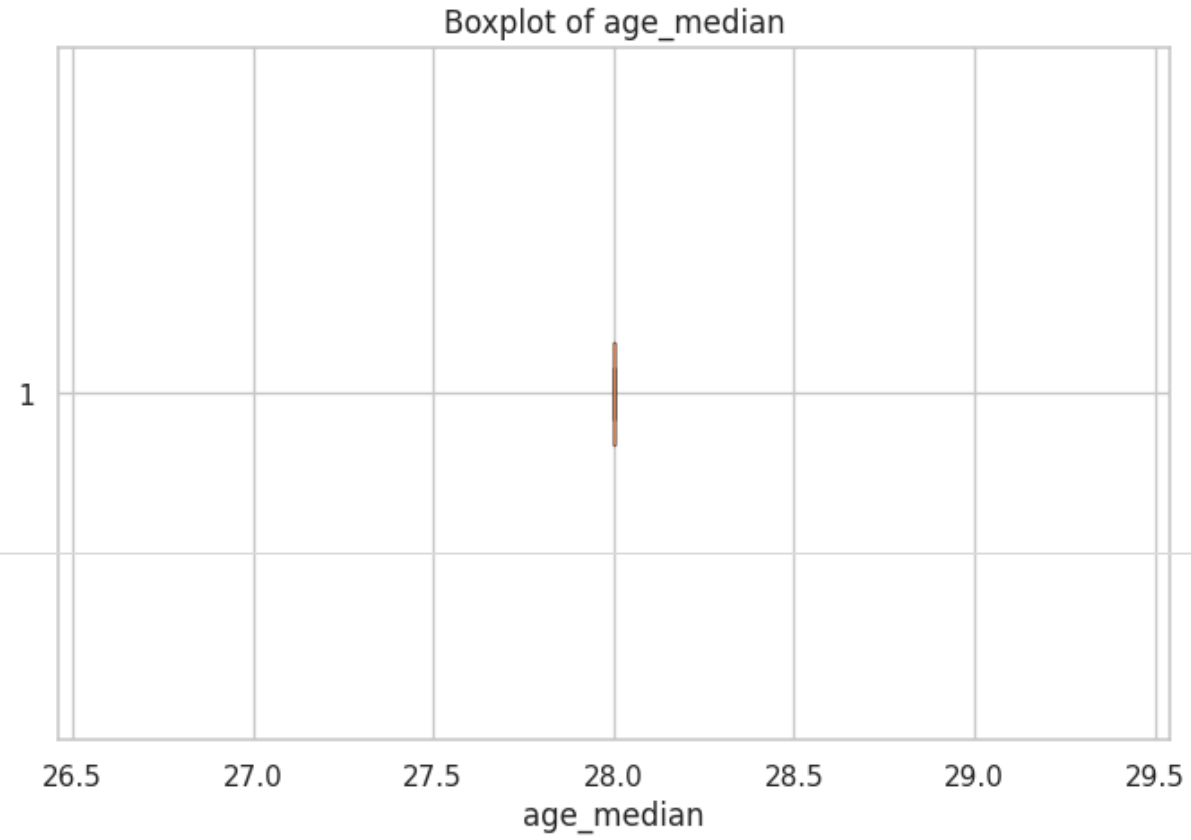


Observation: (add your notes here)

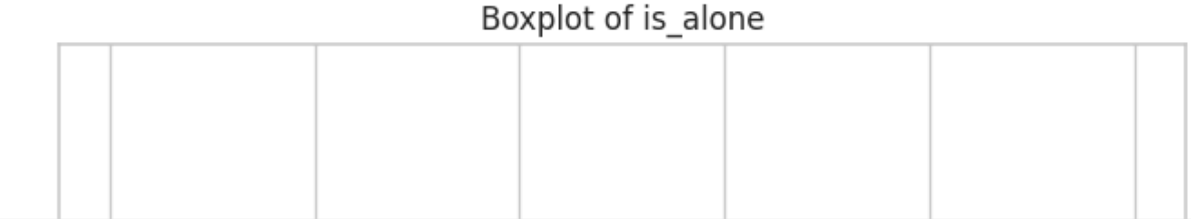




Observation: (add your notes here)



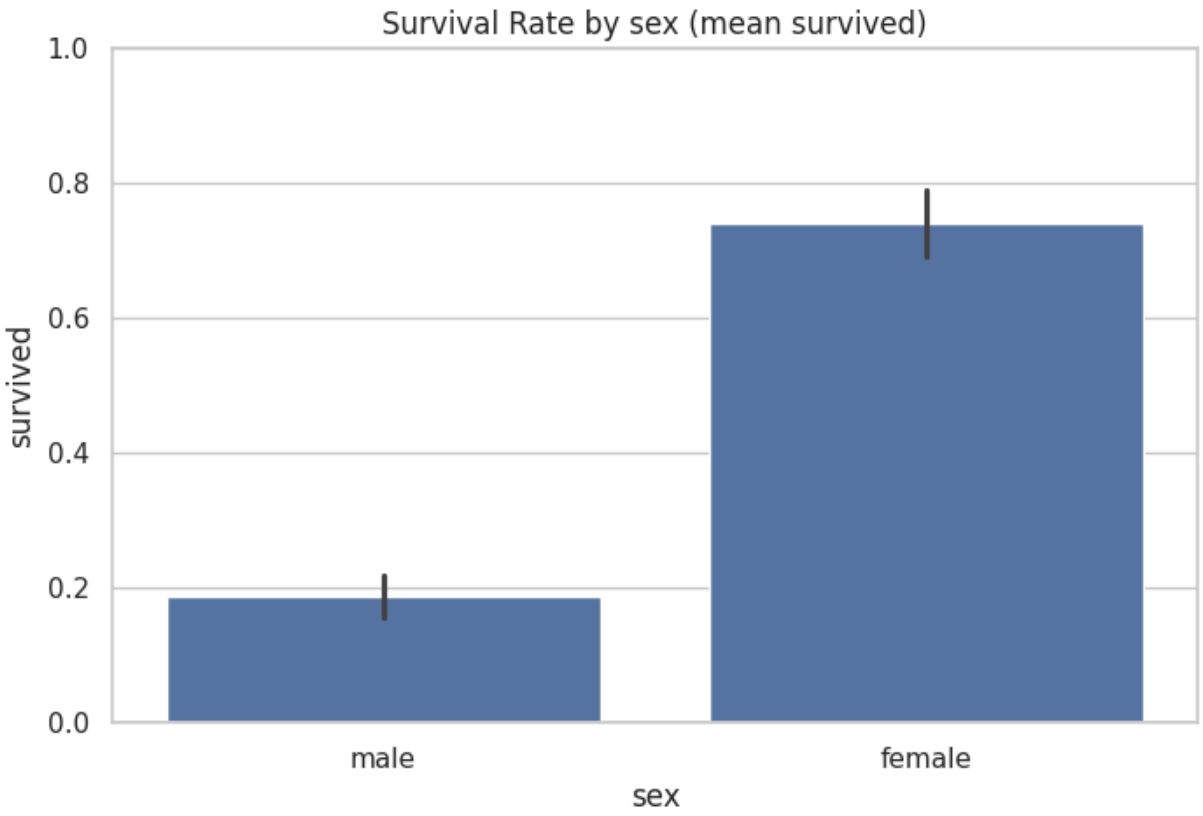
Observation: (add your notes here)



Bivariate Analysis

Compare features against the target variable `survived` (or a target of your choice).
Use barplots, violinplots, or grouped statistics.

```
# 8. Survival rate by categorical variables (example)
if 'survived' in df_clean.columns:
    cat_cols = ['sex','class','embark_town','who','deck','is_alone']
    for col in cat_cols:
        if col in df_clean.columns:
            plt.figure()
            sns.barplot(x=col, y='survived', data=df_clean, estimator=np.mea
            plt.title(f'Survival Rate by {col} (mean survived)')
            plt.ylim(0,1)
            plt.show()
            print('\nObservation:  (add your notes here)\n---\n')
```




```
Observation:  (add your notes here)
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```

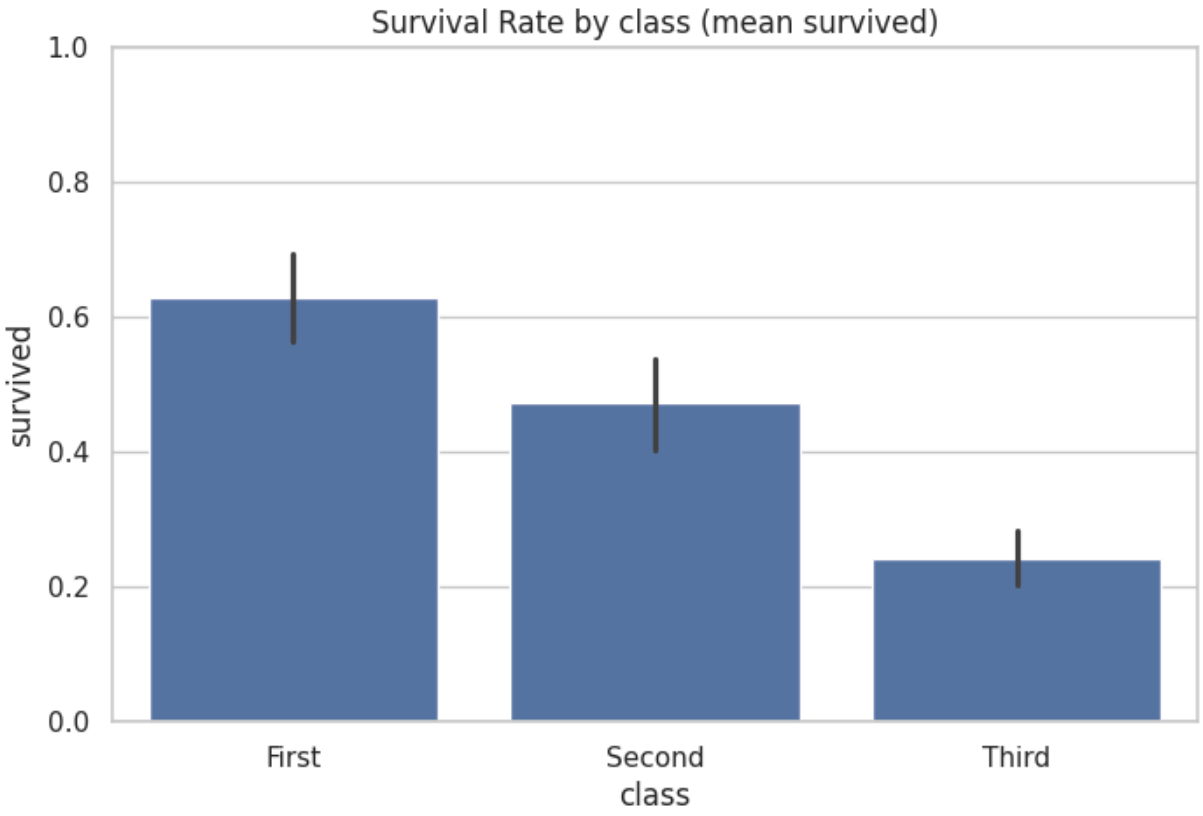


```
Observation:  (add your notes here)
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```

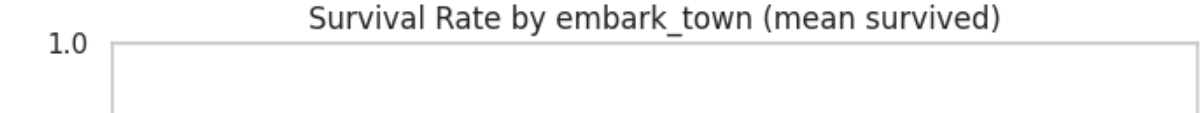

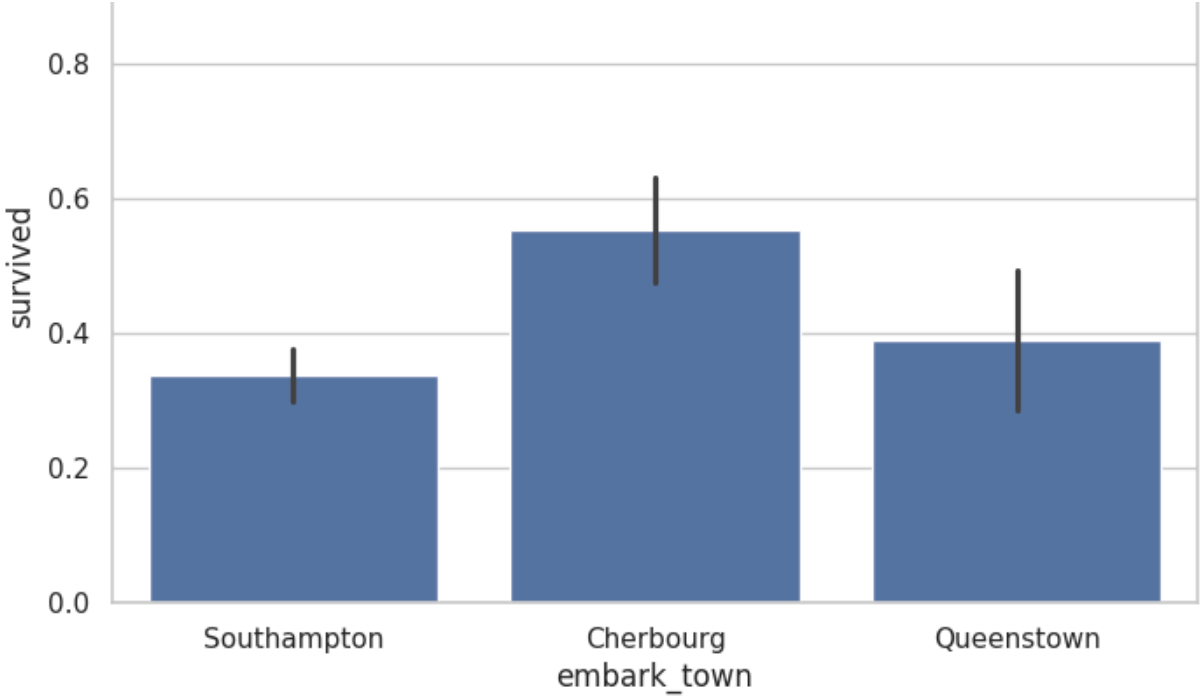


```
Observation:  (add your notes here)
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```

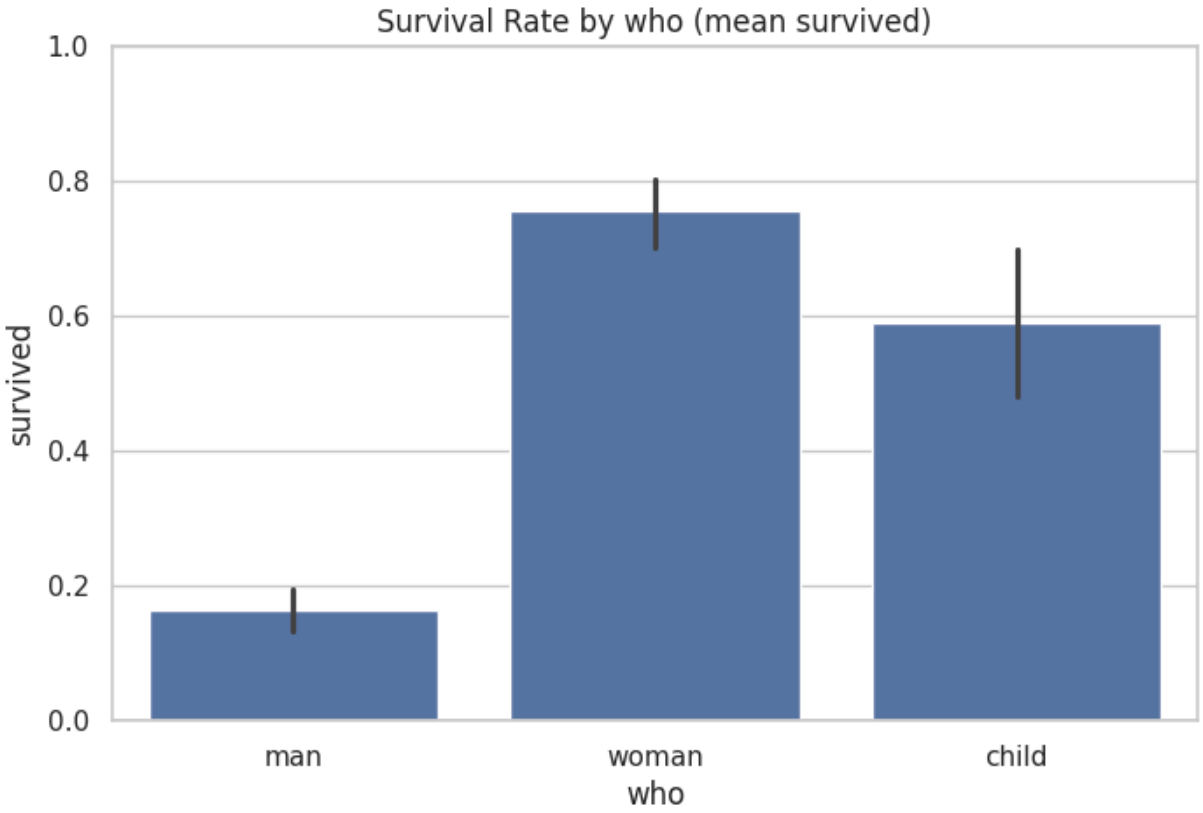


```
Observation:  (add your notes here)
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```

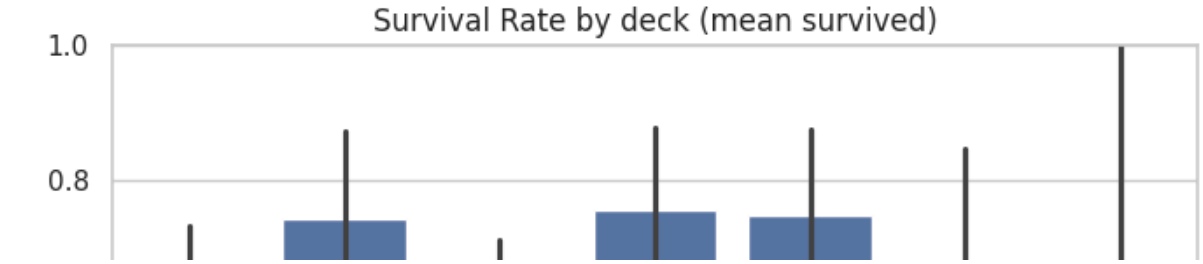

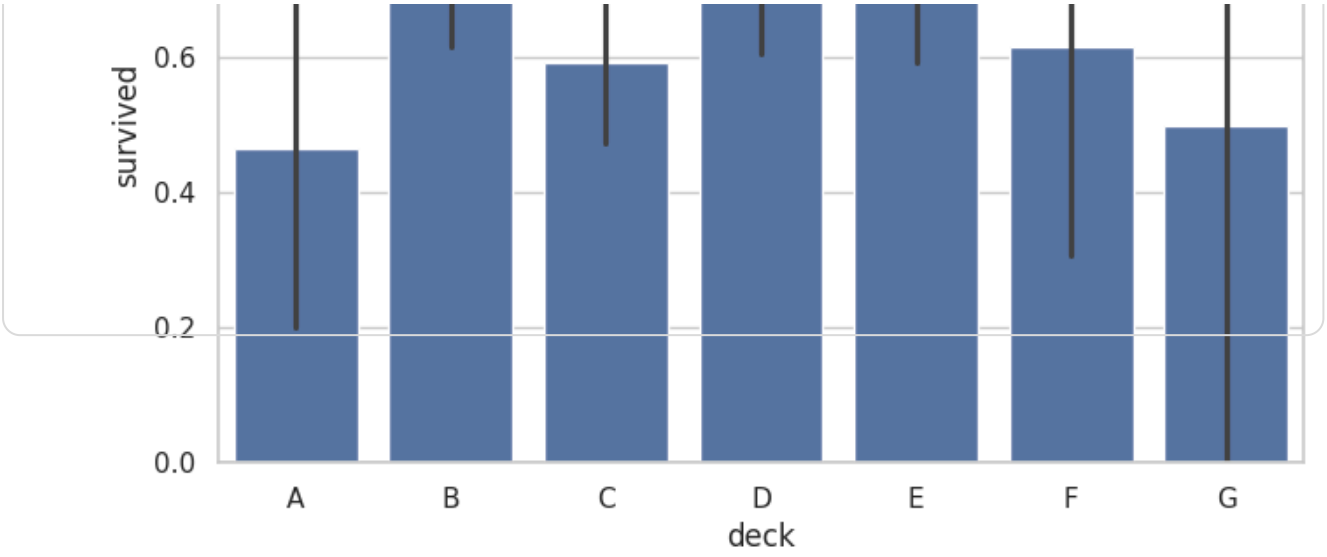


```
Observation:  (add your notes here)
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```

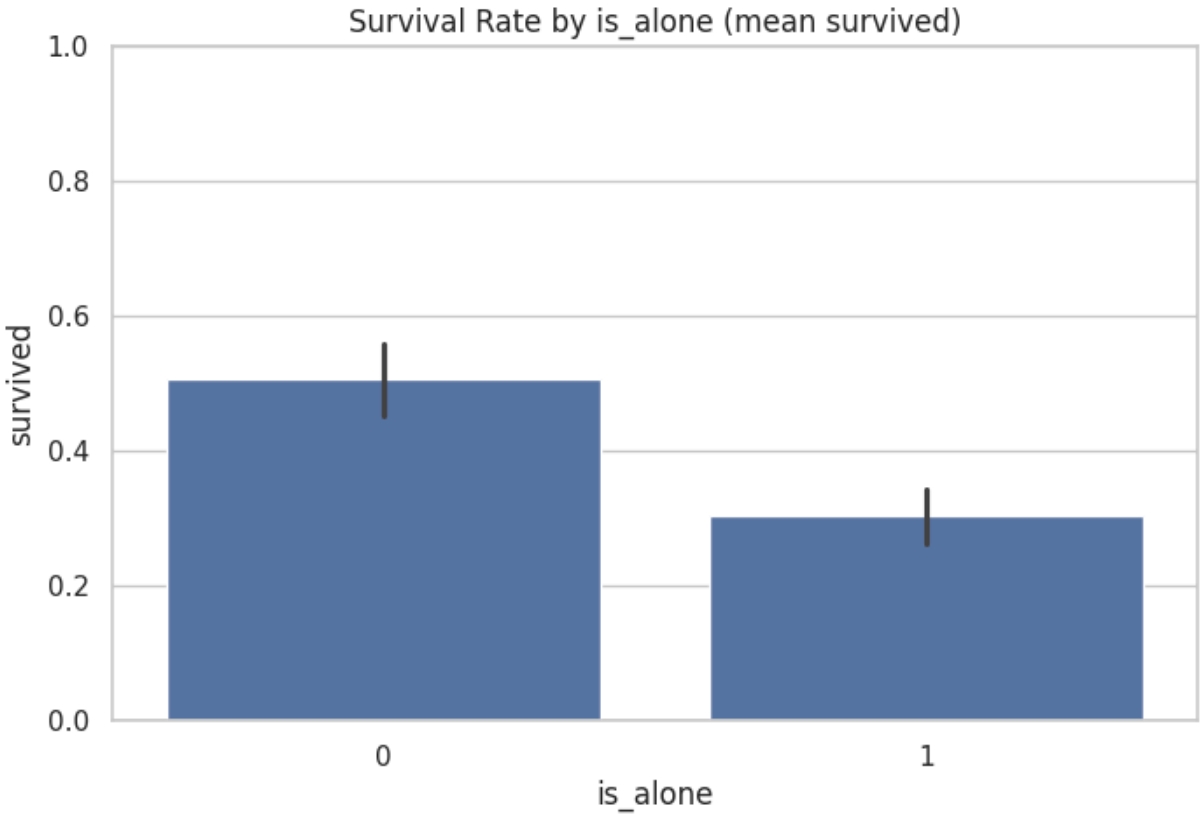


```
Observation:  (add your notes here)
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```