In [3]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

```
Matplotlib is building the font cache; this may take a moment.
```

In [9]:
```
# Load the dataset
df = pd.read_csv("gender_submission.csv")
```

In [11]:
```
df
```

Out[11]:

	PassengerId	Survived
0	892	0
1	893	1
2	894	0
3	895	0
4	896	1
...	...	...
413	1305	0
414	1306	1
415	1307	0
416	1308	0
417	1309	0

418 rows × 2 columns

In [13]:
```
# Display dataset info
print("Dataset Info:")
print(df.info())
```

```
Dataset Info:
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 418 entries, 0 to 417
Data columns (total 2 columns):
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
 0   PassengerId  418 non-null    int64
 1   Survived     418 non-null    int64
dtypes: int64(2)
memory usage: 6.7 KB
None
```

In [15]:
```
# Check missing values
print("\nMissing Values:")
print(df.isnull().sum())
```

```
Missing Values:
PassengerId    0
Survived       0
dtype: int64
```

In [17]:
```
# Check survival rates
print("\nSurvival Rate:")
survival_rate = df["Survived"].mean() * 100
print(f"Overall Survival Rate: {survival_rate:.2f}%")
```

```
Survival Rate:
Overall Survival Rate: 36.36%
```

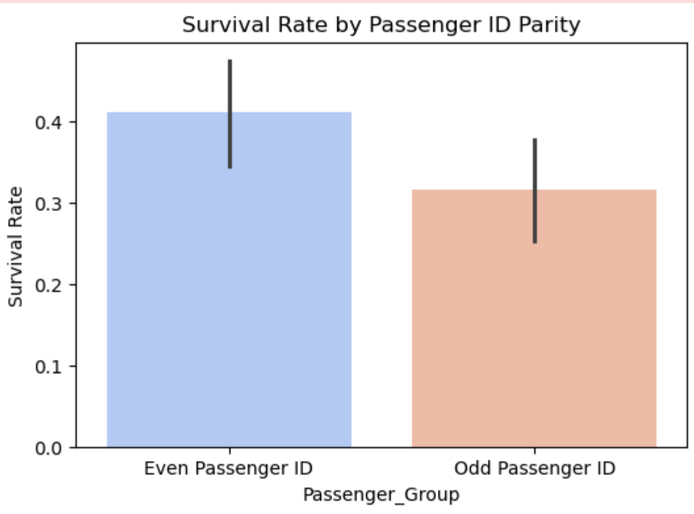
In [19]:
```
# Add a hypothetical feature: Even/Odd Passenger ID survival
df["Passenger_Group"] = df["PassengerId"] % 2  # 0 for even, 1 for odd
```

In [21]:
```
# Visualize survival by Passenger ID group
plt.figure(figsize=(6, 4))
sns.barplot(x="Passenger_Group", y="Survived", data=df, palette="coolwarm")
plt.xticks([0, 1], ["Even Passenger ID", "Odd Passenger ID"])
plt.title("Survival Rate by Passenger ID Parity")
plt.ylabel("Survival Rate")
plt.show()
```

```
/var/folders/r3/trn6xwcx7js3_2j79fkcxz880000gn/T/ipykernel_21042/2445076293.py:3: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same effect.

  sns.barplot(x="Passenger_Group", y="Survived", data=df, palette="coolwarm")
```



In [23]:
```
# Random sampling for inspection
sample_df = df.sample(10, random_state=42)
print("\nRandom Sample of the Dataset:")
print(sample_df)
```

```
Random Sample of the Dataset:
     PassengerId  Survived  Passenger_Group
321         1213         0                1
324         1216         1                0
388         1280         0                0
56           948         0                0
153         1045         1                1
30           922         0                0
72           964         1                0
82           974         0                0
258         1150         1                0
416         1308         0                0
```

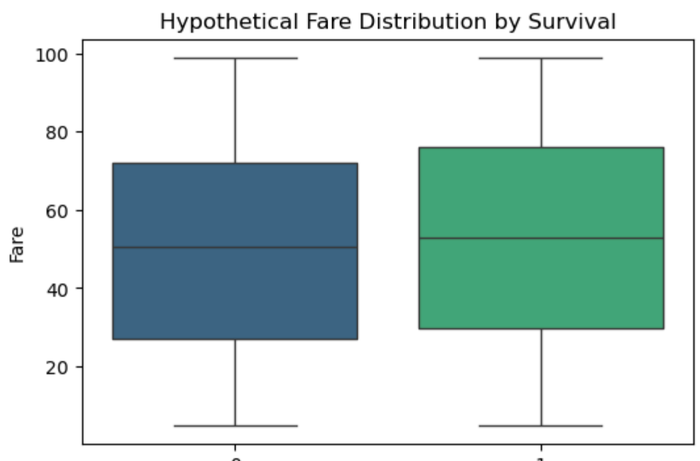
In [25]:
```
# Creating synthetic Fare and Age data for visualization
np.random.seed(42)
df["Fare"] = np.random.randint(5, 100, size=len(df))
df["Age"] = np.random.randint(10, 70, size=len(df))
```

In [27]:
```
# Visualizing survival vs synthetic Fare
plt.figure(figsize=(6, 4))
sns.boxplot(x="Survived", y="Fare", data=df, palette="viridis")
plt.title("Hypothetical Fare Distribution by Survival")
plt.show()
```

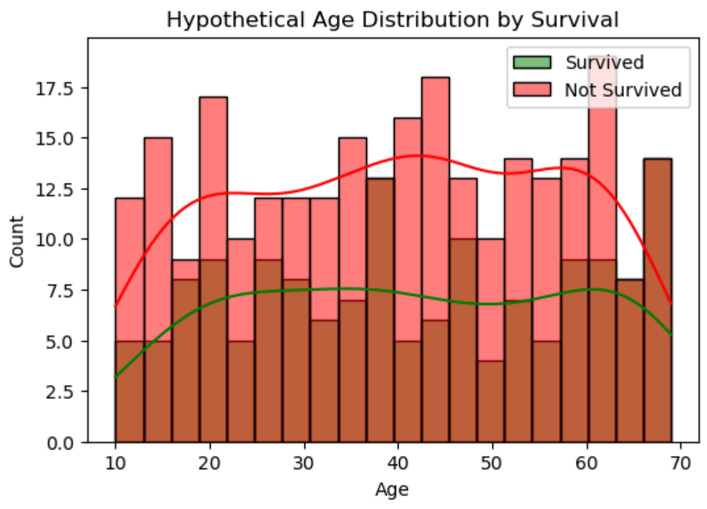
```
/var/folders/r3/trn6xwcx7js3_2j79fkcxz880000gn/T/ipykernel_21042/3298729266.py:3: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same effect.

  sns.boxplot(x="Survived", y="Fare", data=df, palette="viridis")
```



In [29]:
```
# Visualizing survival vs synthetic Age
plt.figure(figsize=(6, 4))
sns.histplot(df[df["Survived"] == 1]["Age"], bins=20, kde=True, color="green", label="Survived")
sns.histplot(df[df["Survived"] == 0]["Age"], bins=20, kde=True, color="red", label="Not Survived")
plt.title("Hypothetical Age Distribution by Survival")
plt.xlabel("Age")
plt.legend()
plt.show()
```


Hypothetical Age Distribution by Survival
Survived
Not Survived
Count
Age
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
10
20
30
40
50
60
70

In [ ]: