Health app analysis

Here we are provided real time usage data of a user who used this health app for ten days. Our job is to analyse the usage pattern and derive insights from the data.

```
#getting the packages
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from wordcloud import WordCloud
from datetime import datetime

#loading the data
logs_df =
pd.read_csv('/content/sample_data/HealthApp_2k.log_structured.csv')
logs_df.head()
```

```
   LineId                     Time                  Component
Pid  \
0       1  20171223-22:15:29:606                   Step_LSC  30002312

1       2  20171223-22:15:29:615                   Step_LSC  30002312

2       3  20171223-22:15:29:633  Step_StandReportReceiver  30002312

3       4  20171223-22:15:29:635                   Step_LSC  30002312

4       5  20171223-22:15:29:635     Step_StandStepCounter  30002312


                                              Content EventId  \
0                           onStandStepChanged 3579     E42
1                      onExtend:1514038530000 14 0 4     E39
2  onReceive action: android.intent.action.SCREEN_ON     E41
3  processHandleBroadcastAction action:android.in...     E43
4                                  flush sensor data     E12

                                       EventTemplate
0                           onStandStepChanged <*>
1                          onExtend:<*> <*> <*> <*>
2  onReceive action: android.intent.action.SCREEN_ON
3  processHandleBroadcastAction action:android.in...
4                                  flush sensor data
```

```
#examining the dataset
logs_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2000 entries, 0 to 1999
Data columns (total 7 columns):
 #   Column         Non-Null Count  Dtype
```

```
---  ------         --------------  -----
 0   LineId         2000 non-null   int64
 1   Time           2000 non-null   object
 2   Component      2000 non-null   object
 3   Pid            2000 non-null   int64
 4   Content        2000 non-null   object
 5   EventId        2000 non-null   object
 6   EventTemplate  2000 non-null   object
dtypes: int64(2), object(5)
memory usage: 109.5+ KB
```

```
#formatting the time
logs_df['Time'] = pd.to_datetime(logs_df['Time'], format='%Y%m%d-%H:%M:%S:%f')
logs_df['Time']
```

```
0      2017-12-23 22:15:29.606
1      2017-12-23 22:15:29.615
2      2017-12-23 22:15:29.633
3      2017-12-23 22:15:29.635
4      2017-12-23 22:15:29.635
                  ...
1995   2017-12-24 00:58:53.985
1996   2017-12-24 00:59:07.581
1997   2017-12-24 01:00:00.794
1998   2017-12-24 01:01:00.935
1999   2017-12-24 01:02:35.789
Name: Time, Length: 2000, dtype: datetime64[ns]
```

```
#seeing various components counts
logs_df['Component'].value_counts()
```

```
Step_LSC                          710
Step_SPUtils                      494
Step_ExtSDM                       482
Step_StandReportReceiver          171
HiH_HiSyncControl                  42
Step_StandStepCounter              19
HiH_DataStatManager                17
HiH_HiHealthDataInsertStore        11
HiH_                               10
HiH_HiHealthBinder                  9
HiH_HiAppUtil                       8
Step_FlushableStepDataCache         8
HiH_HiBroadcastUtil                 5
Step_StandStepDataManager           5
HiH_ListenerManager                 2
HiH_HiSyncUtil                      2
Step_HGNH                           2
Step_ScreenUtil                     1
```

```
Step_DataCache                    1
Step_NotificationUtil             1
Name: Component, dtype: int64
```

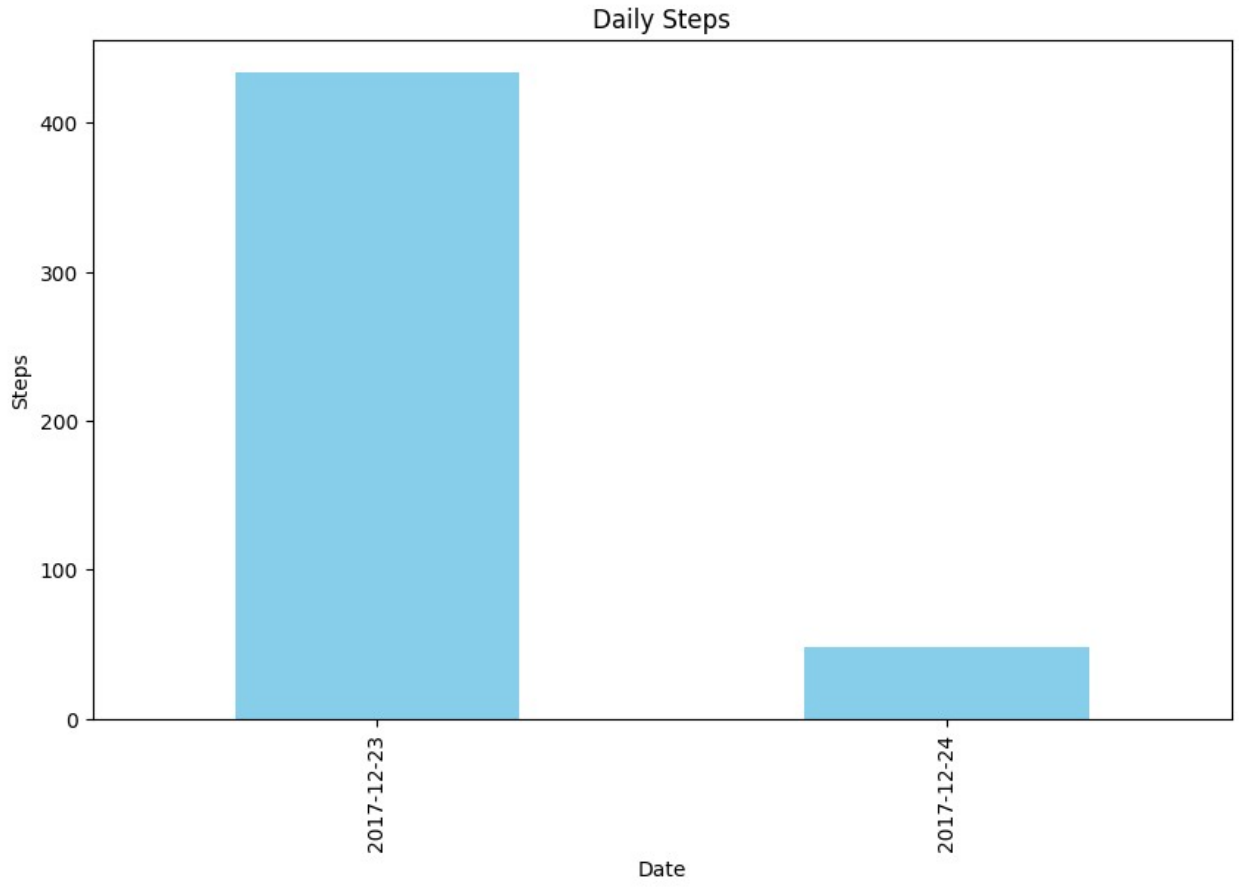
```
#seeing various content counts
logs_df['Content'].value_counts()
```

```
calculateAltitudeWithCache totalAltitude=240
217
processHandleBroadcastAction action:android.intent.action.TIME_TICK
144
onStandStepChanged 3786
73
onStandStepChanged 3761
59
calculateCaloriesWithCache totalCalories=130673
48


...
onExtend:1514038677000 1 0 4
1
 getTodayTotalDetailSteps =
1514038560000##7105##548582##8661##16256##27319968
1
setTodayTotalDetailSteps=1514038560000##7106##548583##8661##16256##273
20969                                  1
calculateCaloriesWithCache totalCalories=128895
1
checkCurrentDay a new day comes , reset basicSyncCondition, currentDay
is 20171224 oldDay is 20171223      1
Name: Content, Length: 1179, dtype: int64
```

```
#counting the daily steps
daily_steps = logs_df[logs_df['Component'] ==
'Step_ExtSDM'].groupby(logs_df['Time'].dt.date)['Content'].count()
```

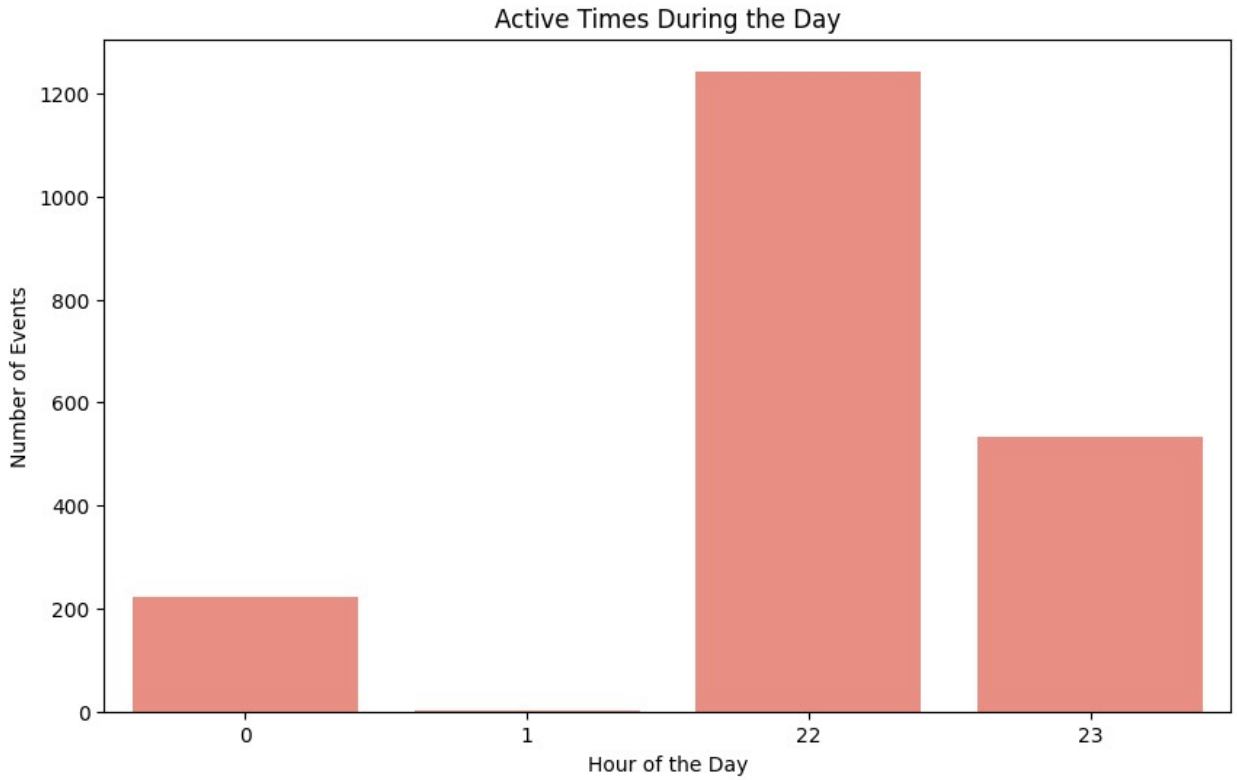
```
# Daily Steps Plot
plt.figure(figsize=(10, 6))
daily_steps.plot(kind='bar', color='skyblue')
plt.title('Daily Steps')
plt.xlabel('Date')
plt.ylabel('Steps')
plt.show()
```




```
#seeing the active times
logs_df['Hour'] = logs_df['Time'].dt.hour
active_times = logs_df.groupby('Hour')['LineId'].count()
active_times
```

```
Hour
0      221
1        3
22    1243
23     533
Name: LineId, dtype: int64
```

```
# Active Times Plot
plt.figure(figsize=(10, 6))
sns.barplot(x=active_times.index, y=active_times.values,
color='salmon')
plt.title('Active Times During the Day')
plt.xlabel('Hour of the Day')
plt.ylabel('Number of Events')
plt.show()
```




```
# Filtering rows related to workout activities
workout_df = logs_df[logs_df['Component'].isin(['Step_LSC',
'Step_ExtSDM'])]
workout_df
```

```
      LineId                     Time    Component       Pid  \
0          1 2017-12-23 22:15:29.606     Step_LSC  30002312
1          2 2017-12-23 22:15:29.615     Step_LSC  30002312
3          4 2017-12-23 22:15:29.635     Step_LSC  30002312
7          8 2017-12-23 22:15:29.636     Step_LSC  30002312
8          9 2017-12-23 22:15:29.645  Step_ExtSDM  30002312
...      ...                     ...          ...       ...
1995    1996 2017-12-24 00:58:53.985     Step_LSC  30002312
1996    1997 2017-12-24 00:59:07.581     Step_LSC  30002312
1997    1998 2017-12-24 01:00:00.794     Step_LSC  30002312
1998    1999 2017-12-24 01:01:00.935     Step_LSC  30002312
1999    2000 2017-12-24 01:02:35.789     Step_LSC  30002312

                                              Content EventId  \
0                           onStandStepChanged 3579     E42
1                     onExtend:1514038530000 14 0 4     E39
3     processHandleBroadcastAction action:android.in...     E43
7                           onStandStepChanged 3579     E42
8       calculateCaloriesWithCache totalCalories=126775      E4
...                                                ...     ...
1995  processHandleBroadcastAction action:android.in...     E44
```

```
1996  processHandleBroadcastAction action:android.in...     E44
1997  processHandleBroadcastAction action:android.in...     E44
1998  processHandleBroadcastAction action:android.in...     E44
1999  processHandleBroadcastAction action:android.in...     E44
```

```
                                          EventTemplate  Hour
0                                onStandStepChanged <*>    22
1                              onExtend:<*> <*> <*> <*>    22
3     processHandleBroadcastAction action:android.in...    22
7                                onStandStepChanged <*>    22
8          calculateCaloriesWithCache totalCalories=<*>    22
...                                                  ...   ...
1995  processHandleBroadcastAction action:android.in...     0
1996  processHandleBroadcastAction action:android.in...     0
1997  processHandleBroadcastAction action:android.in...     1
1998  processHandleBroadcastAction action:android.in...     1
1999  processHandleBroadcastAction action:android.in...     1

[1192 rows x 8 columns]
```

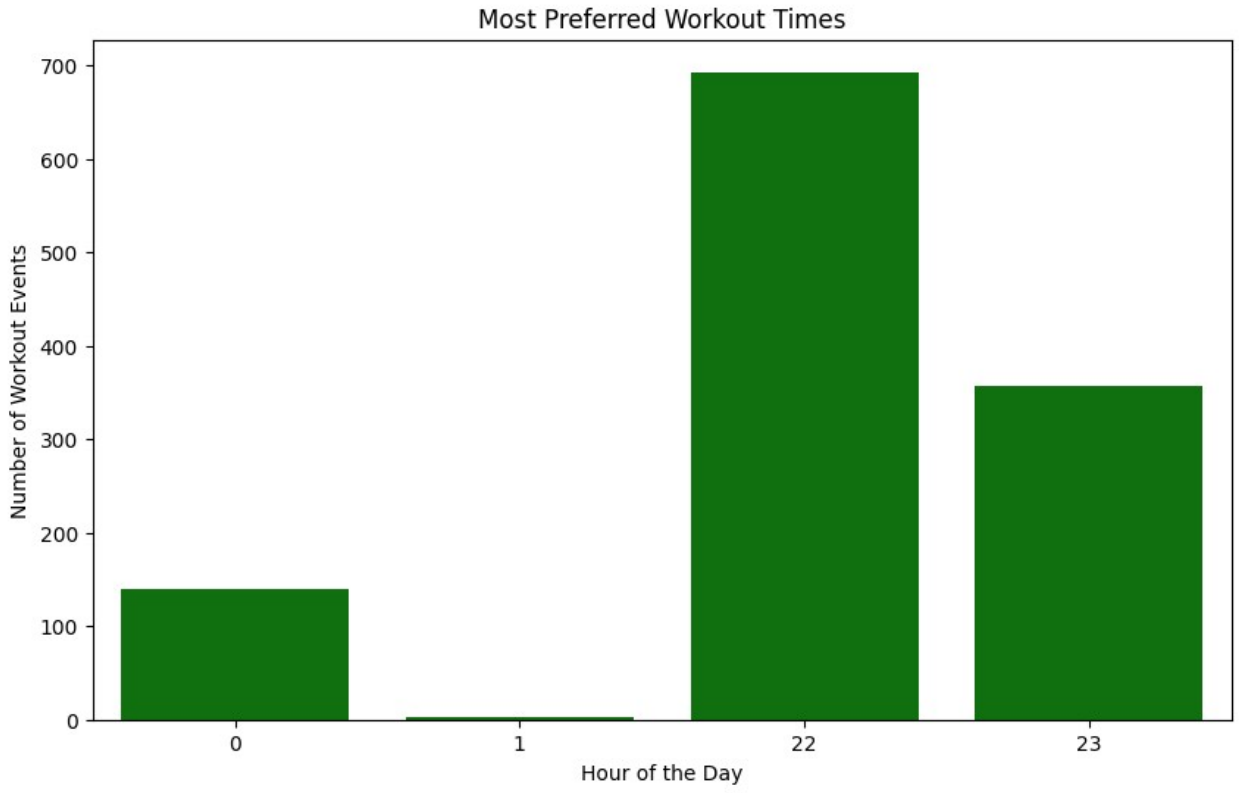
```
# Extracting the hour from the 'Time' column
workout_df['Hour'] = workout_df['Time'].dt.hour

# Counting the occurrences of each hour
preferred_workout_times = workout_df['Hour'].value_counts()

# Visualizing the preferred workout times
plt.figure(figsize=(10, 6))
sns.barplot(x=preferred_workout_times.index,
y=preferred_workout_times.values, color='green')
plt.title('Most Preferred Workout Times')
plt.xlabel('Hour of the Day')
plt.ylabel('Number of Workout Events')
plt.show()
```

```
<ipython-input-26-d281c619dea1>:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation:
https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#
returning-a-view-versus-a-copy
  workout_df['Hour'] = workout_df['Time'].dt.hour
```




```
# Identifying the hour with the maximum occurrences
most_preferred_hour = preferred_workout_times.idxmax()
print(f"The most preferred workout time is at
{most_preferred_hour}:00")
```

```
The most preferred workout time is at 22:00
```

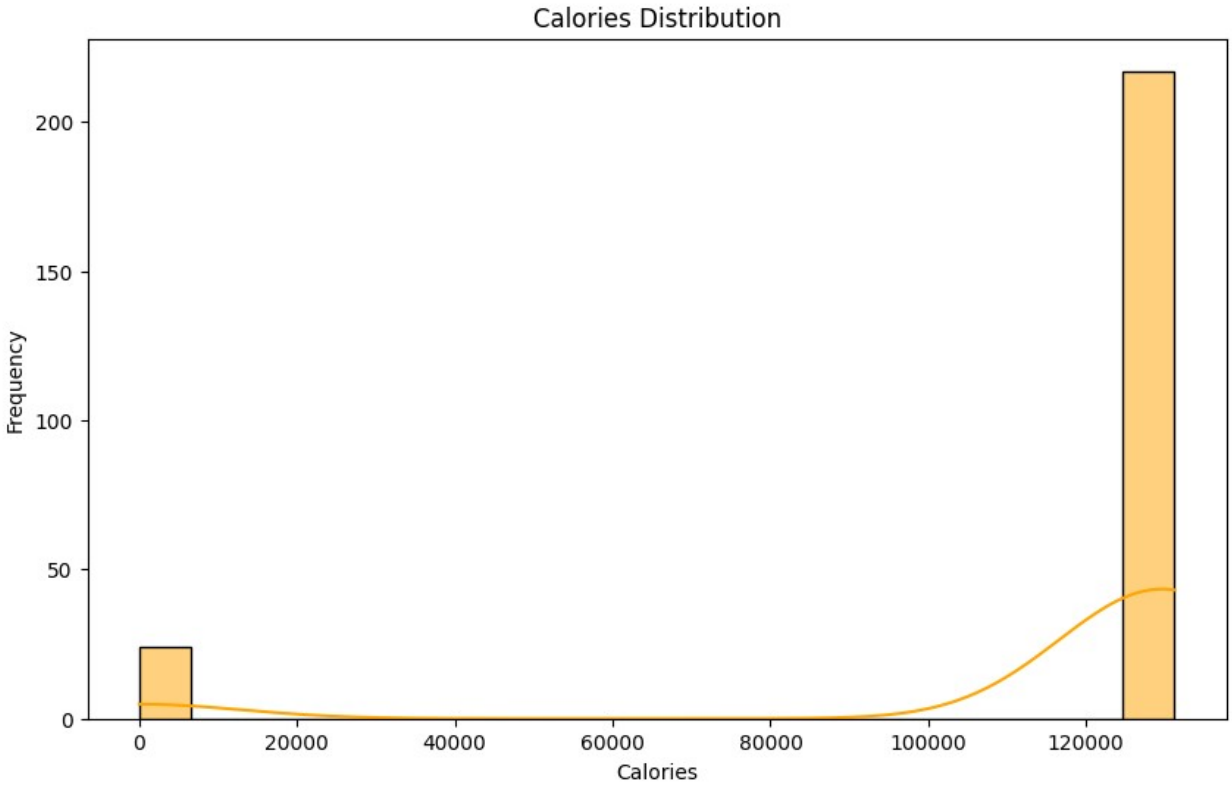
```
#  Calorie Calculation
calorie_df = logs_df[logs_df['Component'] == 'Step_ExtSDM']
calorie_df['Calories'] =
calorie_df['Content'].str.extract(r'totalCalories=(\
d+)').astype(float)
calorie_df['Calories']
```

```
<ipython-input-28-f800275b7575>:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation:
https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#
returning-a-view-versus-a-copy
  calorie_df['Calories'] =
calorie_df['Content'].str.extract(r'totalCalories=(\
d+)').astype(float)
```

```
8       126775.0
9            NaN
17      126797.0
18           NaN
24      126818.0
          ...
1954         NaN
1959         0.0
1960         NaN
1968         0.0
1969         NaN
Name: Calories, Length: 482, dtype: float64
```

```
# Visualize calorie calculation
plt.figure(figsize=(10, 6))
sns.histplot(calorie_df['Calories'], bins=20, kde=True,
color='orange')
plt.title('Calories Distribution')
plt.xlabel('Calories')
plt.ylabel('Frequency')
plt.show()
```




```
#  Altitude Changes
altitude_df = logs_df[logs_df['Component'] == 'Step_ExtSDM']
altitude_df['Altitude'] =
```

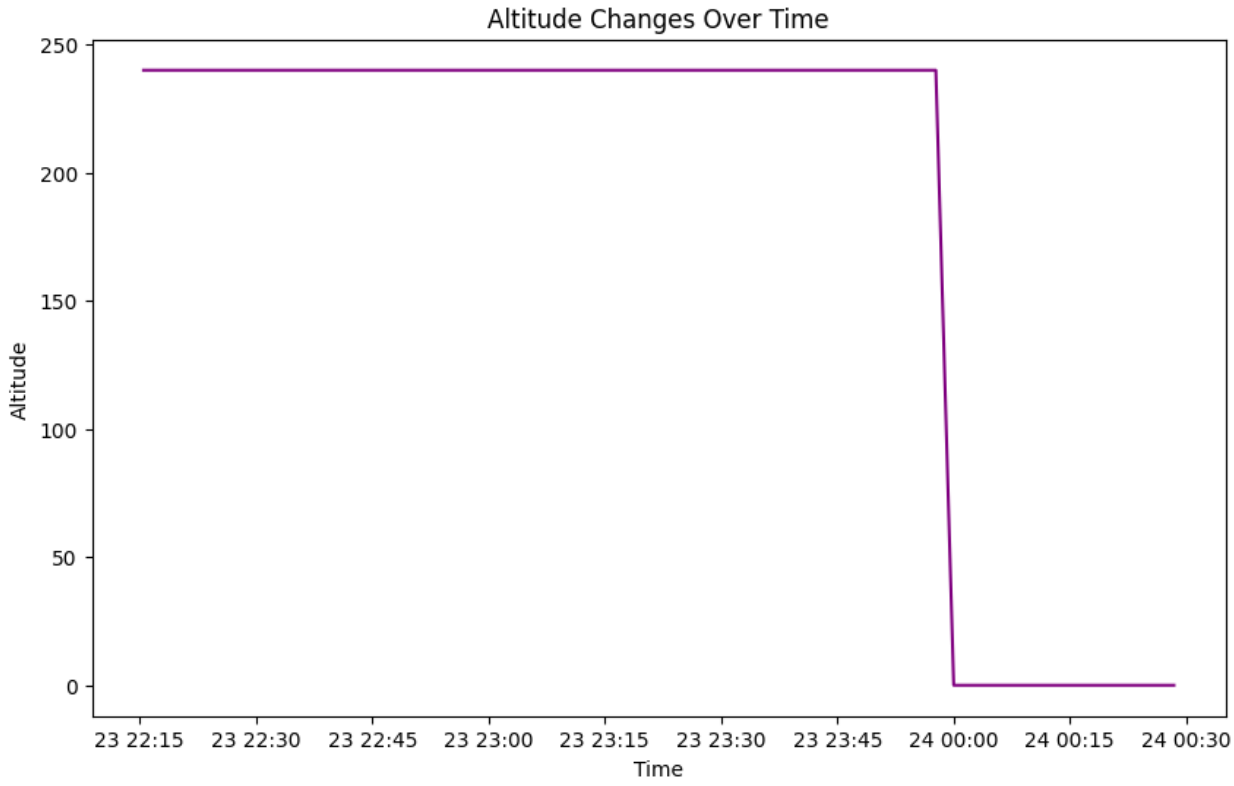
```
altitude_df['Content'].str.extract(r'totalAltitude=(\
d+)').astype(float)
altitude_df['Altitude']
```

```
<ipython-input-30-7cd68927c175>:3: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation:
https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#
returning-a-view-versus-a-copy
  altitude_df['Altitude'] =
altitude_df['Content'].str.extract(r'totalAltitude=(\
d+)').astype(float)
```

```
8         NaN
9       240.0
17        NaN
18      240.0
24        NaN
        ...
1954      0.0
1959      NaN
1960      0.0
1968      NaN
1969      0.0
Name: Altitude, Length: 482, dtype: float64
```

```
# Visualizing altitude changes wrt time
plt.figure(figsize=(10, 6))
sns.lineplot(x=altitude_df['Time'], y=altitude_df['Altitude'],
color='purple')
plt.title('Altitude Changes Over Time')
plt.xlabel('Time')
plt.ylabel('Altitude')
plt.show()
```




```
#  Event Distribution Over Time
plt.figure(figsize=(14, 6))
sns.histplot(logs_df['Time'], bins=50, kde=True, color='orange')
plt.title('Event Distribution Over Time')
plt.xlabel('Time')
plt.ylabel('Number of Events')
plt.show()
```