◆ Set 4:

Set 4:-
The attachments are two datasets, one contains organization, project, and user-level event data and another one has the respective event description and their sections on the app. Here, Event means any click or page load, or scroll happening on the app.

Q. The goal is to identify patterns & insights from the dataset. Also, look out for insights/triggers that activated the users and subsequently engaged them.

We understand this is very open-ended, and that's the point. Be creative.

```python
In [16]: import numpy as np
         import pandas as pd
         import matplotlib.pyplot as plt
         import seaborn as sns
```

```python
In [17]: df1 = pd.read_csv("User - Event Raw Dataset (2).csv" , parse_dates=[0])
         df2 = pd.read_csv("Event Description Mapping (2).csv")
         display(df1,df2)
```

	created_at_time	event	org_id	project_id	user_id
0	2022-04-20 18:24:30	project_creation_request_success	ORG-2nufoaj370k	PRJ4k2kct6c5854	USRl50abktx6cc1
1	2022-04-25 23:29:54	task_log_create_success	ORG-7fcq2k7b4xg	PRJ0ypqfy9v4kii	USRqki2dkqwj6xj
2	2022-04-25 23:29:54	task_creation	ORG-7fcq2k7b4xg	PRJ0ypqfy9v4kii	USRqki2dkqwj6xj
3	2022-04-25 23:28:23	project_creation_request_success	ORG-7fcq2k7b4xg	PRJfk9dy2gb6dhp	USRqki2dkqwj6xj
4	2022-03-22 20:40:20	task_log_create_success	ORG-iluuim4club	PRJ1jrd11tr99dc	USRcsxgn7-vnztk
...	...	...	...	...	...
41172	2022-04-07 08:12:59	assigned_people_on_task	ORG588585401431	PRJ971575485352	USR811917964372
41173	2022-04-07 10:30:06	assigned_people_on_task	ORG588585401431	PRJ497168717769	USR811917964372
41174	2022-04-12 17:54:06	assigned_people_on_task	ORG588585401431	PRJjzxmbzag9e6v	USR189569223674
41175	2022-02-21 23:59:56	task_creation	ORG593668212572	PRJ436423104439	USR067850628645
41176	2022-02-21 23:56:51	project_creation_request_success	ORG593668212572	PRJ630204356710	USR067850628645

41177 rows × 5 columns

	Event	Description	Section
0	add_attendance_success	Successfully adding attendance of a person once	Labour
1	assigned_people_on_task	Assigned another person on a particular task	Task
2	attendance_list_accessed	Attendance list page opens on clicking this bu...	Labour
3	channel_message_sent	Message sent on chat feature	General
4	comment_create_success	Comment Created	General
5	dashboard_view_success	Dashboard Page Loading for a particular organi...	General
6	followup_button_clicked	Clicking Followup on a particular task/tasklog	Task
7	generate_report_success	Report for the overall work done generated for...	General
8	image_upload_success	User uploads an image on the app	General
9	indent_create_success	Material Added to Inventory	Material
10	material_profile_material_load	Material list page opens on clicking this button	Material
11	new_material_added	Material Added to Inventory in 'Material' Section	Material
12	project_creation_request_success	Successfully creating a new project	General
13	stock_material_updated	Updating Stock in the inventory	Material
14	task_creation	Successfully creating a task	Task
15	task_log_create_success	Successfully creating an update on a particula...	Task
16	thread_create_success	Successfully creating an Issue against a line ...	General

```python
In [19]: df1.event.nunique()
```

```
Out[19]: 17
```

```python
In [20]: df = pd.merge(df1,df2,left_on='event', right_on='Event',how='left')
         df
```

`Out[20]:`

	created_at_time	event	org_id	project_id	user_id	Event	Description
0	2022-04-20 18:24:30	project_creation_request_success	ORG-2nufoaj370k	PRJ4k2kct6c5854	USRl50abktx6cc1	project_creation_request_success	Successfully creating a new project
1	2022-04-25 23:29:54	task_log_create_success	ORG-7fcq2k7b4xg	PRJ0ypqfy9v4kii	USRqki2dkqwj6xj	task_log_create_success	Successfully creating an update on a particula...
2	2022-04-25 23:29:54	task_creation	ORG-7fcq2k7b4xg	PRJ0ypqfy9v4kii	USRqki2dkqwj6xj	task_creation	Successfully creating a task
3	2022-04-25 23:28:23	project_creation_request_success	ORG-7fcq2k7b4xg	PRJfk9dy2gb6dhp	USRqki2dkqwj6xj	project_creation_request_success	Successfully creating a new project
4	2022-03-22 20:40:20	task_log_create_success	ORG-iluuim4club	PRJ1jrd11tr99dc	USRcsxgn7-vnztk	task_log_create_success	Successfully creating an update on a particula...
...	...	...	...	...	...	...	...
41172	2022-04-07 08:12:59	assigned_people_on_task	ORG588585401431	PRJ971575485352	USR811917964372	assigned_people_on_task	Assigned another person on a particular task
41173	2022-04-07 10:30:06	assigned_people_on_task	ORG588585401431	PRJ497168717769	USR811917964372	assigned_people_on_task	Assigned another person on a particular task
41174	2022-04-12 17:54:06	assigned_people_on_task	ORG588585401431	PRJjzxmbzag9e6v	USR189569223674	assigned_people_on_task	Assigned another person on a particular task
41175	2022-02-21 23:59:56	task_creation	ORG593668212572	PRJ436423104439	USR067850628645	task_creation	Successfully creating a task
41176	2022-02-21 23:56:51	project_creation_request_success	ORG593668212572	PRJ630204356710	USR067850628645	project_creation_request_success	Successfully creating a new project

41177 rows × 8 columns

`In [22]:`
```python
df.drop(columns='Event' , inplace=True)
```

`In [27]:`
```python
df
```

`Out[27]:`

	created_at_time	event	org_id	project_id	user_id	Description	Section
0	2022-04-20 18:24:30	project_creation_request_success	ORG-2nufoaj370k	PRJ4k2kct6c5854	USRl50abktx6cc1	Successfully creating a new project	General
1	2022-04-25 23:29:54	task_log_create_success	ORG-7fcq2k7b4xg	PRJ0ypqfy9v4kii	USRqki2dkqwj6xj	Successfully creating an update on a particula...	Task
2	2022-04-25 23:29:54	task_creation	ORG-7fcq2k7b4xg	PRJ0ypqfy9v4kii	USRqki2dkqwj6xj	Successfully creating a task	Task
3	2022-04-25 23:28:23	project_creation_request_success	ORG-7fcq2k7b4xg	PRJfk9dy2gb6dhp	USRqki2dkqwj6xj	Successfully creating a new project	General
4	2022-03-22 20:40:20	task_log_create_success	ORG-iluuim4club	PRJ1jrd11tr99dc	USRcsxgn7-vnztk	Successfully creating an update on a particula...	Task
...	...	...	...	...	...	...	...
41172	2022-04-07 08:12:59	assigned_people_on_task	ORG588585401431	PRJ971575485352	USR811917964372	Assigned another person on a particular task	Task
41173	2022-04-07 10:30:06	assigned_people_on_task	ORG588585401431	PRJ497168717769	USR811917964372	Assigned another person on a particular task	Task
41174	2022-04-12 17:54:06	assigned_people_on_task	ORG588585401431	PRJjzxmbzag9e6v	USR189569223674	Assigned another person on a particular task	Task
41175	2022-02-21 23:59:56	task_creation	ORG593668212572	PRJ436423104439	USR067850628645	Successfully creating a task	Task
41176	2022-02-21 23:56:51	project_creation_request_success	ORG593668212572	PRJ630204356710	USR067850628645	Successfully creating a new project	General

41177 rows × 7 columns

```
In [23]:  df.isna().sum()

Out[23]:  created_at_time       0
          event                 0
          org_id                0
          project_id          141
          user_id               0
          Description           0
          Section               0
          dtype: int64
```

```
In [24]:  df.created_at_time.min() , df.created_at_time.max()

Out[24]:  (Timestamp('2022-01-01 22:59:53'), Timestamp('2023-02-23 14:10:43'))
```

```
In [25]:  timeframe = df.created_at_time.max() - df.created_at_time.min()
          timeframe

Out[25]:  Timedelta('417 days 15:10:50')
```

```
In [44]:  df.user_id.nunique()

Out[44]:  543
```

```
In [45]:  df.org_id.nunique()

Out[45]:  386
```

```
In [46]:  df.project_id.nunique()

Out[46]:  914
```

```
In [48]:  df.project_id.value_counts(dropna=False)

Out[48]:  project_id
          PRJ256203650640    12820
          PRJppirvslunbh9     1779
          PRJ63dg0jj0k-vo     1481
          PRJ8p2m3wyqmzs7     1348
          PRJ355445863893     1280
                              ...
          PRJ248835439387        1
          PRJavjwjc8r2upz        1
          PRJ385368385547        1
          PRJ726446108695        1
          PRJ630204356710        1
          Name: count, Length: 915, dtype: int64
```

◆ Insights:

- There are 543 unique users of the App.
- There are 386 unique organizations who interact with the App.
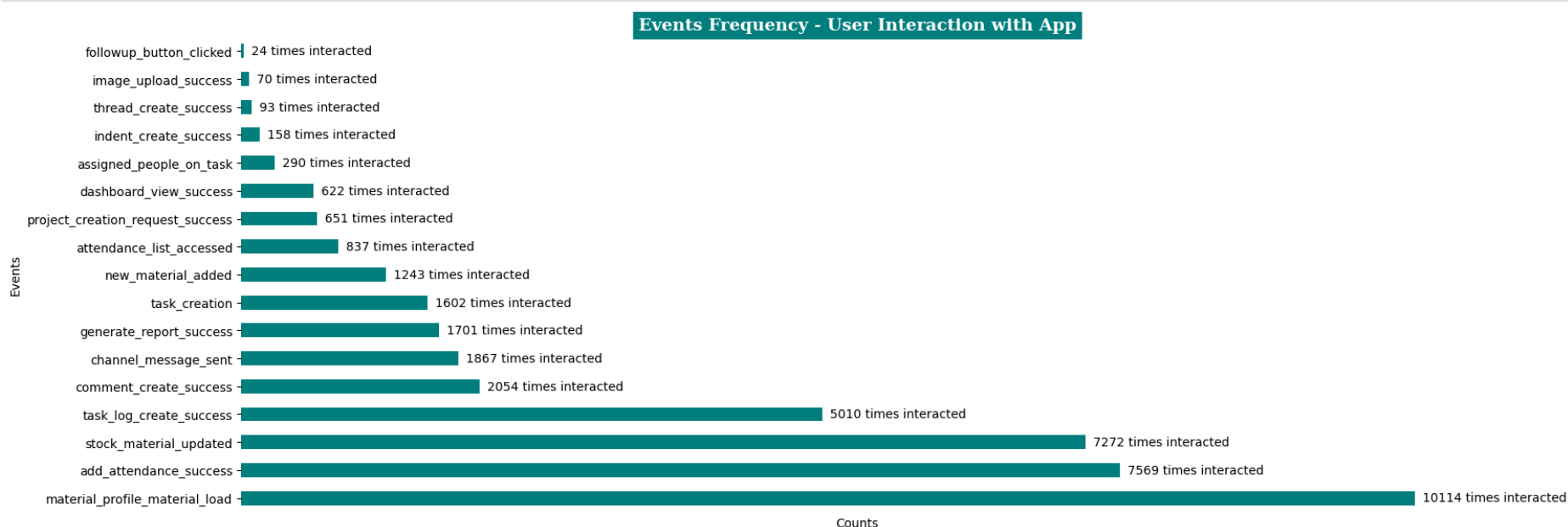- There are 914 known current Projects with 141 data with unknown project_id.

```
In [26]:  df.event.value_counts()

Out[26]:  event
          material_profile_material_load     10114
          add_attendance_success              7569
          stock_material_updated              7272
          task_log_create_success             5010
          comment_create_success              2054
          channel_message_sent                1867
          generate_report_success             1701
          task_creation                       1602
          new_material_added                  1243
          attendance_list_accessed             837
          project_creation_request_success     651
          dashboard_view_success               622
          assigned_people_on_task              290
          indent_create_success                158
          thread_create_success                 93
          image_upload_success                  70
          followup_button_clicked               24
          Name: count, dtype: int64
```

```
In [43]:  event_counts = df['event'].value_counts()

          plt.figure(figsize=(18,7))
          plt.style.use('default')
          plt.style.use('seaborn-v0_8-bright')
          a=event_counts.plot(kind='barh', color='teal')
          a.bar_label(a.containers[0], label_type='edge', labels=[f'  {val} times interacted' for val in event_counts])
          plt.title(f'Events Frequency - User Interaction with App',fontsize=14,fontfamily='serif',fontweight='bold',
                    backgroundcolor='teal',color='w')
          sns.despine(left=True , bottom=True)
          plt.xlabel('Counts')
          plt.ylabel('Events')
```

```
plt.xticks([])
plt.show()
```


Events Frequency - User Interaction with App

followup_button_clicked — 24 times interacted
image_upload_success — 70 times interacted
thread_create_success — 93 times interacted
indent_create_success — 158 times interacted
assigned_people_on_task — 290 times interacted
dashboard_view_success — 622 times interacted
project_creation_request_success — 651 times interacted
attendance_list_accessed — 837 times interacted
new_material_added — 1243 times interacted
task_creation — 1602 times interacted
generate_report_success — 1701 times interacted
channel_message_sent — 1867 times interacted
comment_create_success — 2054 times interacted
task_log_create_success — 5010 times interacted
stock_material_updated — 7272 times interacted
add_attendance_success — 7569 times interacted
material_profile_material_load — 10114 times interacted

◆ Insights:

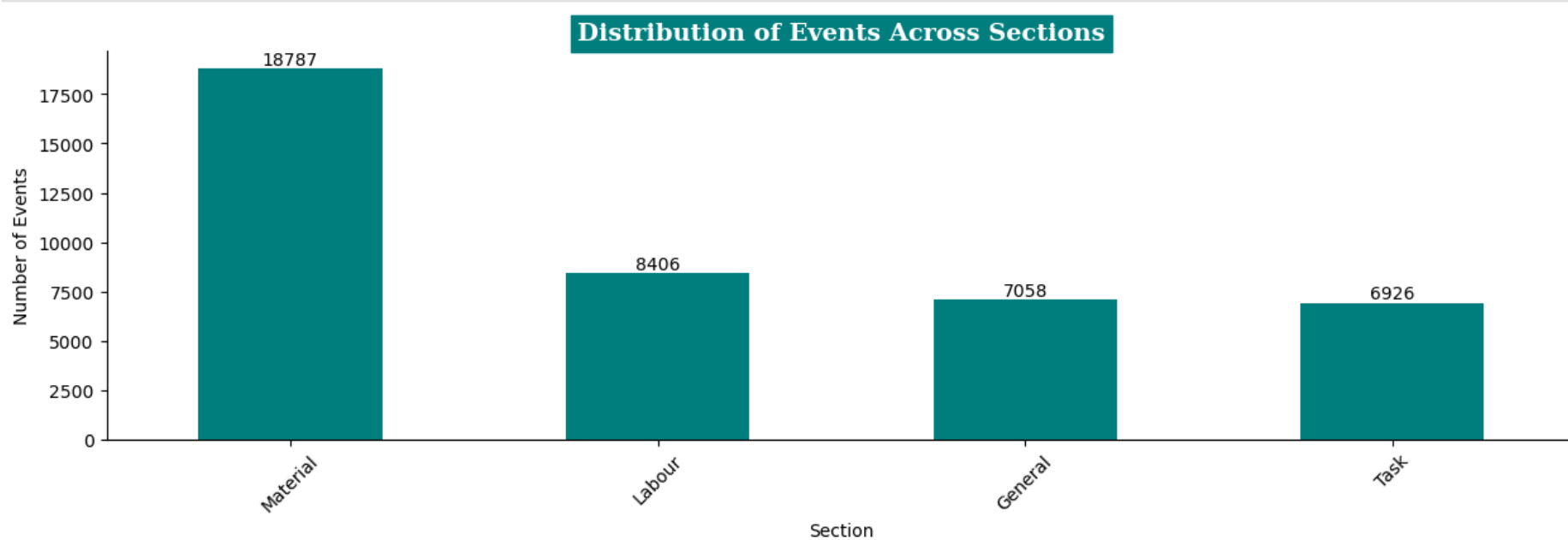- The Top 10 most common events and their frequencies:
    - 1. Material_profile_material_load - 10114 occurrences
    - 1. Add_attendance_success - 7569 occurrences
    - 1. Stock_material_updated - 7272 occurrences
    - 1. Task_log_create_success - 5010 occurrences
    - 1. Comment_create_success - 2054 occurrences
    - 1. Channel_message_sent - 1867 occurrences
    - 1. Generate_report_success - 1701 occurrences
    - 1. Task_creation - 1602 occurrences
    - 1. New_material_added - 1243 occurrences
    - 1. Attendance_list_accessed - 837 occurrences

    > This help us understand the most common interactions users have with the app.

In [31]:
```python
section_counts = df['Section'].value_counts()

plt.figure(figsize=(15,4))
plt.style.use('default')
plt.style.use('seaborn-v0_8-bright')

a=section_counts.plot(kind='bar', color='teal')
a.bar_label(a.containers[0], label_type='edge')
plt.title(f'Distribution of Events Across Sections',fontsize=14,fontfamily='serif',fontweight='bold',
          backgroundcolor='teal',color='w')
sns.despine()
plt.xlabel('Section')
plt.ylabel('Number of Events')
plt.xticks(rotation=45)
plt.show()
```


Distribution of Events Across Sections

◆ Insights:

- The No.of Events happend in each section:
    - Material section - 18787 events
    - Labour section - 8406 events
    - General Section - 7058 events
    - Task section - 6926 events

> **This tells us that Users interact with `Material Section` at an enormously higher rate compared to other sections through the App.**

```
In [65]:  interaction_analysis = df.groupby('Description')['user_id'].nunique().sort_values(ascending=False)
          iad = interaction_analysis.to_frame()
          iad
```
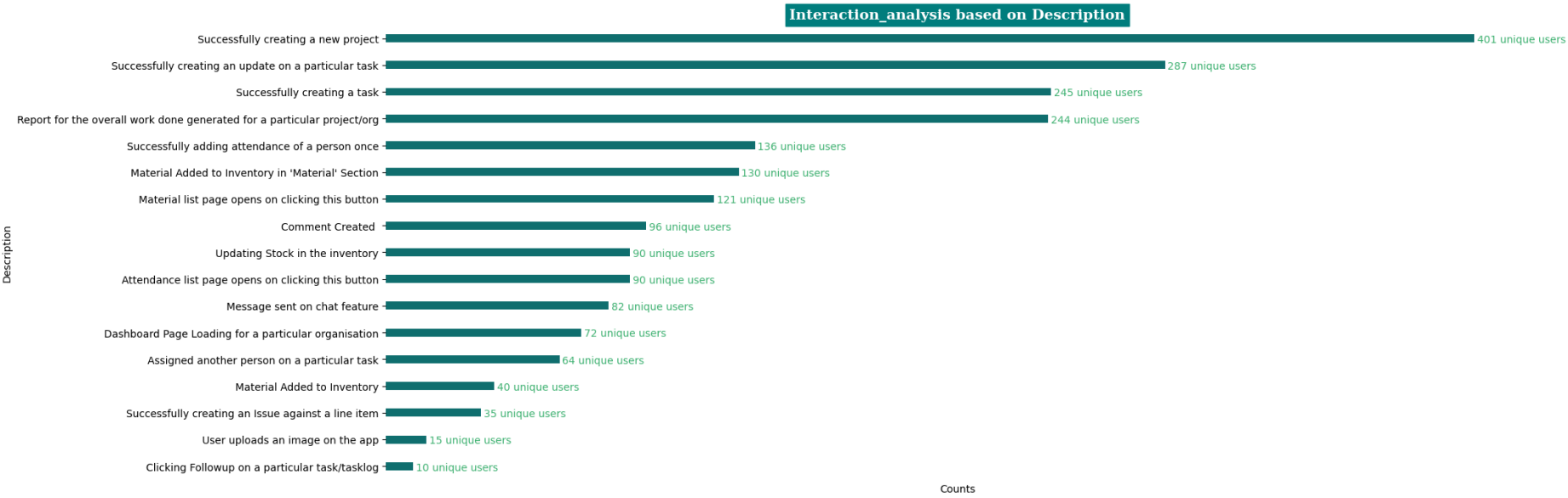
Out[65]:

	user_id
Description	
Successfully creating a new project	401
Successfully creating an update on a particular task	287
Successfully creating a task	245
Report for the overall work done generated for a particular project/org	244
Successfully adding attendance of a person once	136
Material Added to Inventory in 'Material' Section	130
Material list page opens on clicking this button	121
Comment Created	96
Updating Stock in the inventory	90
Attendance list page opens on clicking this button	90
Message sent on chat feature	82
Dashboard Page Loading for a particular organisation	72
Assigned another person on a particular task	64
Material Added to Inventory	40
Successfully creating an Issue against a line item	35
User uploads an image on the app	15
Clicking Followup on a particular task/tasklog	10

```
In [87]:  plt.figure(figsize=(20,8))
          plt.style.use('default')
          plt.style.use('seaborn-v0_8-bright')

          c1=sns.barplot(data=iad , x=iad.user_id , y=iad.index, orient='h' , color='teal' , width=0.3)

          plt.title(f'Interaction_analysis based on Description',fontsize=14,fontfamily='serif',fontweight='bold',
                    backgroundcolor='teal',color='w')
          top_n = 17
          for i in range(top_n):
              c1.annotate(f"{iad.user_id[i]} unique users", ((iad.user_id[i]+1),i+0.15), ha='left', va='baseline',color='mediumseagreen')
          sns.despine(left=True , bottom=True)
          plt.xlabel('Counts')
          plt.ylabel('Description')
          plt.xticks([])
          plt.show()
```


◆ Insights:

- The analysis of event descriptions and their impact on user interactions shows the following top 10 descriptions with unique user interactions:
  - 1. Successfully creating a new project: 401 unique users
  - 1. Successfully creating an update on a particular task: 287 unique users
  - 1. Successfully creating a task: 245 unique users
  - 1. Report for the overall work done generated for a particular project/org: 244 unique users
  - 1. Successfully adding attendance of a person once: 136 unique users
  - 1. Material Added to Inventory in 'Material' Section: 130 unique users
  - 1. Material list page opens on clicking this button: 121 unique users

- 1. Comment Created: 96 unique users
- 1. Updating Stock in the inventory: 90 unique users
- 1. Attendance list page opens on clicking this button: 90 unique users

These insights provide valuable information on the user engagement triggered by different event descriptions.

In [89]:
```python
df.groupby(['event','Description'])['user_id'].nunique().sort_values(ascending=False)
```

Out[89]:
```
event                          Description
project_creation_request_success  Successfully creating a new project                        401
task_log_create_success           Successfully creating an update on a particular task       287
task_creation                     Successfully creating a task                               245
generate_report_success           Report for the overall work done generated for a particular project/org  244
add_attendance_success            Successfully adding attendance of a person once            136
new_material_added                Material Added to Inventory in 'Material' Section          130
material_profile_material_load    Material list page opens on clicking this button           121
comment_create_success            Comment Created                                             96
attendance_list_accessed          Attendance list page opens on clicking this button          90
stock_material_updated            Updating Stock in the inventory                             90
channel_message_sent              Message sent on chat feature                                82
dashboard_view_success            Dashboard Page Loading for a particular organisation        72
assigned_people_on_task           Assigned another person on a particular task                64
indent_create_success             Material Added to Inventory                                 40
thread_create_success             Successfully creating an Issue against a line item          35
image_upload_success              User uploads an image on the app                            15
followup_button_clicked           Clicking Followup on a particular task/tasklog              10
Name: user_id, dtype: int64
```

In [90]:
```python
df.groupby(['event','Section'])['user_id'].nunique().sort_values(ascending=False)
```

Out[90]:
```
event                          Section
project_creation_request_success  General    401
task_log_create_success           Task       287
task_creation                     Task       245
generate_report_success           General    244
add_attendance_success            Labour     136
new_material_added                Material    130
material_profile_material_load    Material    121
comment_create_success            General     96
attendance_list_accessed          Labour      90
stock_material_updated            Material     90
channel_message_sent              General     82
dashboard_view_success            General     72
assigned_people_on_task           Task        64
indent_create_success             Material     40
thread_create_success             General     35
image_upload_success              General     15
followup_button_clicked           Task        10
Name: user_id, dtype: int64
```

In [96]:
```python
df.groupby('Section')[['event']].nunique()
```

Out[96]:

Section	event
General	7
Labour	2
Material	4
Task	4

In [116..]:
```python
df.groupby(['Section','event'])['user_id'].nunique()
```

Out[116]:
```
Section   event
General   channel_message_sent              82
          comment_create_success            96
          dashboard_view_success            72
          generate_report_success          244
          image_upload_success              15
          project_creation_request_success 401
          thread_create_success             35
Labour    add_attendance_success           136
          attendance_list_accessed          90
Material  indent_create_success             40
          material_profile_material_load   121
          new_material_added               130
          stock_material_updated            90
Task      assigned_people_on_task           64
          followup_button_clicked           10
          task_creation                    245
          task_log_create_success          287
Name: user_id, dtype: int64
```

In [122..]:
```python
df['month'] = df['created_at_time'].dt.month
df['year'] = df['created_at_time'].dt.year
```

In [126..]:
```python
df['day'] = df['created_at_time'].dt.day_name()
```

```
In [127… df
```

Out[127]:

	created_at_time	event	org_id	project_id	user_id	Description	Section	month	year	
0	2022-04-20 18:24:30	project_creation_request_success	ORG-2nufoaj370k	PRJ4k2kct6c5854	USRl50abktx6cc1	Successfully creating a new project	General	4	2022	Wedne
1	2022-04-25 23:29:54	task_log_create_success	ORG-7fcq2k7b4xg	PRJ0ypqfy9v4kii	USRqki2dkqwj6xj	Successfully creating an update on a particula…	Task	4	2022	Mo
2	2022-04-25 23:29:54	task_creation	ORG-7fcq2k7b4xg	PRJ0ypqfy9v4kii	USRqki2dkqwj6xj	Successfully creating a task	Task	4	2022	Mo
3	2022-04-25 23:28:23	project_creation_request_success	ORG-7fcq2k7b4xg	PRJfk9dy2gb6dhp	USRqki2dkqwj6xj	Successfully creating a new project	General	4	2022	Mo
4	2022-03-22 20:40:20	task_log_create_success	ORG-iluuim4club	PRJ1jrd11tr99dc	USRcsxgn7-vnztk	Successfully creating an update on a particula…	Task	3	2022	Tue
...	...	...	...	...	...	...	...	...	...	...
41172	2022-04-07 08:12:59	assigned_people_on_task	ORG588585401431	PRJ971575485352	USR811917964372	Assigned another person on a particular task	Task	4	2022	Thur
41173	2022-04-07 10:30:06	assigned_people_on_task	ORG588585401431	PRJ497168717769	USR811917964372	Assigned another person on a particular task	Task	4	2022	Thur
41174	2022-04-12 17:54:06	assigned_people_on_task	ORG588585401431	PRJjzxmbzag9e6v	USR189569223674	Assigned another person on a particular task	Task	4	2022	Tue
41175	2022-02-21 23:59:56	task_creation	ORG593668212572	PRJ436423104439	USR067850628645	Successfully creating a task	Task	2	2022	Mo
41176	2022-02-21 23:56:51	project_creation_request_success	ORG593668212572	PRJ630204356710	USR067850628645	Successfully creating a new project	General	2	2022	Mo

41177 rows × 10 columns

```
In [129… month_mapping = {1: 'January', 2: 'February', 3: 'March', 4: 'April', 5: 'May', 6: 'June',
                7: 'July', 8: 'August', 9: 'September', 10: 'October', 11: 'November', 12: 'December'}

         df['month'] = df['month'].map(month_mapping)
         df.head()
```

Out[129]:

	created_at_time	event	org_id	project_id	user_id	Description	Section	month	year	day	month
0	2022-04-20 18:24:30	project_creation_request_success	ORG-2nufoaj370k	PRJ4k2kct6c5854	USRl50abktx6cc1	Successfully creating a new project	General	April	2022	Wednesday	
1	2022-04-25 23:29:54	task_log_create_success	ORG-7fcq2k7b4xg	PRJ0ypqfy9v4kii	USRqki2dkqwj6xj	Successfully creating an update on a particula…	Task	April	2022	Monday	
2	2022-04-25 23:29:54	task_creation	ORG-7fcq2k7b4xg	PRJ0ypqfy9v4kii	USRqki2dkqwj6xj	Successfully creating a task	Task	April	2022	Monday	
3	2022-04-25 23:28:23	project_creation_request_success	ORG-7fcq2k7b4xg	PRJfk9dy2gb6dhp	USRqki2dkqwj6xj	Successfully creating a new project	General	April	2022	Monday	
4	2022-03-22 20:40:20	task_log_create_success	ORG-iluuim4club	PRJ1jrd11tr99dc	USRcsxgn7-vnztk	Successfully creating an update on a particula…	Task	March	2022	Tuesday	

```
In [137… month_order = ['January', 'February', 'March', 'April', 'May','June', 'July', 'August', 'September',
                'October', 'November', 'December']
         df['month']= pd.Categorical(df['month'],categories=month_order, ordered=True)
```

```
In [138... day_order = ['Monday','Tuesday','Wednesday','Thrusday','Friday','Saturday','Sunday']
          df['day']= pd.Categorical(df['day'],categories=day_order, ordered=True)
```

```
In [144... Monthly_user_interaction = df.groupby(['year','month','day'])[['user_id']].count()
          Monthly_user_interaction
```

Out[144]:

year	month	day	user_id
2022	January	Monday	279
		Tuesday	87
		Wednesday	122
		Thrusday	0
		Friday	96
...	...	...	...
2023	December	Wednesday	0
		Thrusday	0
		Friday	0
		Saturday	0
		Sunday	0

168 rows × 1 columns

```
In [158... Monthly_unique_user_interaction_pivot = df.pivot_table(index=['year','month'],
                                                                columns='day',
                                                                values='user_id',
                                                                aggfunc=pd.Series.unique).astype(int)
          Monthly_unique_user_interaction_pivot
```
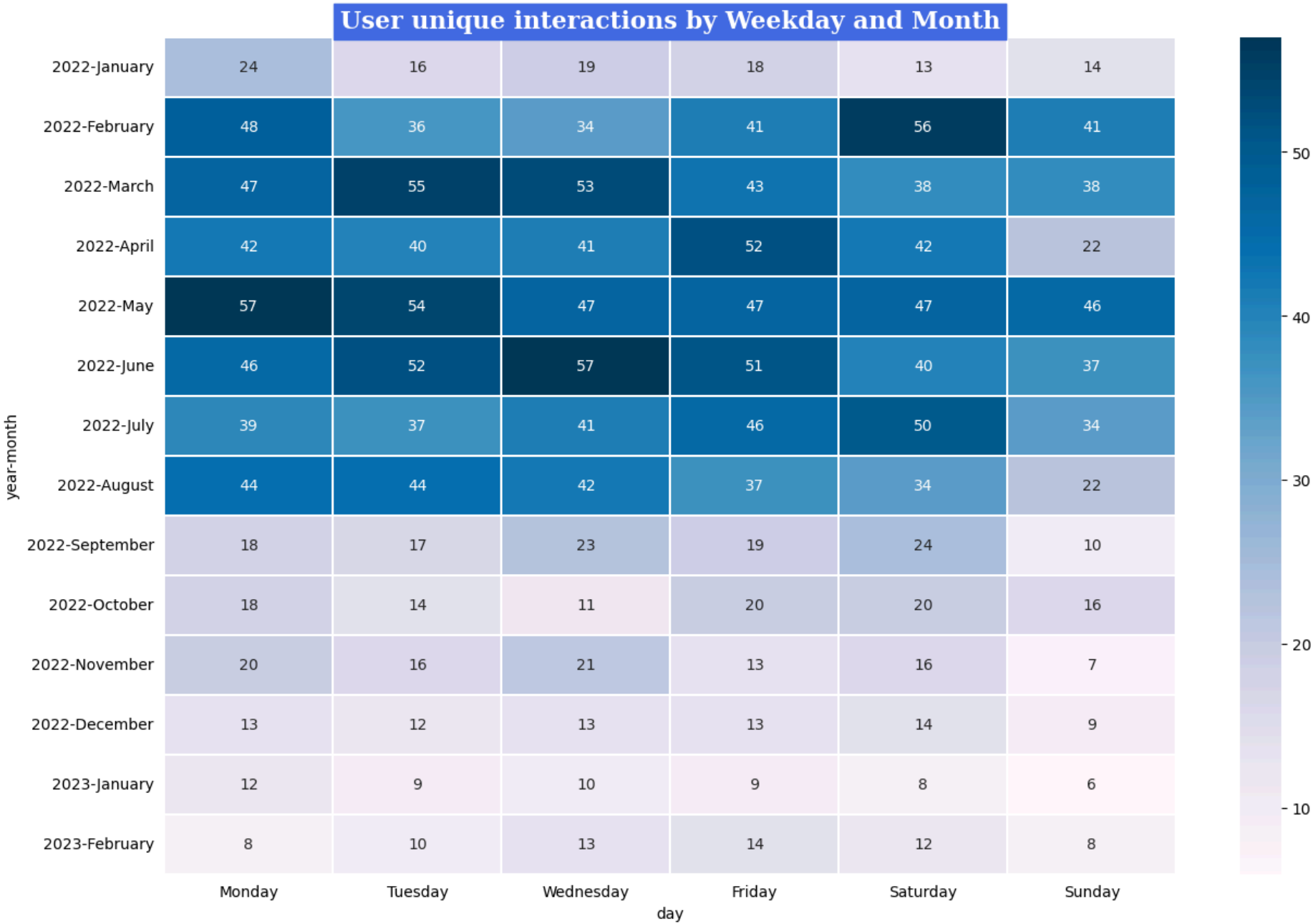
Out[158]:

year	month	day Monday	Tuesday	Wednesday	Friday	Saturday	Sunday
2022	January	24	16	19	18	13	14
	February	48	36	34	41	56	41
	March	47	55	53	43	38	38
	April	42	40	41	52	42	22
	May	57	54	47	47	47	46
	June	46	52	57	51	40	37
	July	39	37	41	46	50	34
	August	44	44	42	37	34	22
	September	18	17	23	19	24	10
	October	18	14	11	20	20	16
	November	20	16	21	13	16	7
	December	13	12	13	13	14	9
2023	January	12	9	10	9	8	6
	February	8	10	13	14	12	8

```
In [172... plt.figure(figsize=(15, 10))
          plt.style.use('default')
          plt.style.use('seaborn-v0_8-bright')
          sns.heatmap(Monthly_unique_user_interaction_pivot, cmap='PuBu',annot=True, fmt='d' , linewidth=0.1)
          plt.title("User unique interactions by Weekday and Month",fontsize=16,fontfamily='serif',fontweight='bold',
                    backgroundcolor='royalblue',color='w')
          plt.tick_params(axis='both', which='both', left=False, bottom=False)
          plt.show()
```

User unique interactions by Weekday and Month

year-month	Monday	Tuesday	Wednesday	Friday	Saturday	Sunday
2022-January	24	16	19	18	13	14
2022-February	48	36	34	41	56	41
2022-March	47	55	53	43	38	38
2022-April	42	40	41	52	42	22
2022-May	57	54	47	47	47	46
2022-June	46	52	57	51	40	37
2022-July	39	37	41	46	50	34
2022-August	44	44	42	37	34	22
2022-September	18	17	23	19	24	10
2022-October	18	14	11	20	20	16
2022-November	20	16	21	13	16	7
2022-December	13	12	13	13	14	9
2023-January	12	9	10	9	8	6
2023-February	8	10	13	14	12	8

```
In [160…
Monthly__user_interaction_pivot = df.pivot_table(index=['year','month'],
                                                 columns='day',
                                                 values='user_id',
                                                 aggfunc=pd.Series.count).astype(int)
Monthly__user_interaction_pivot
```
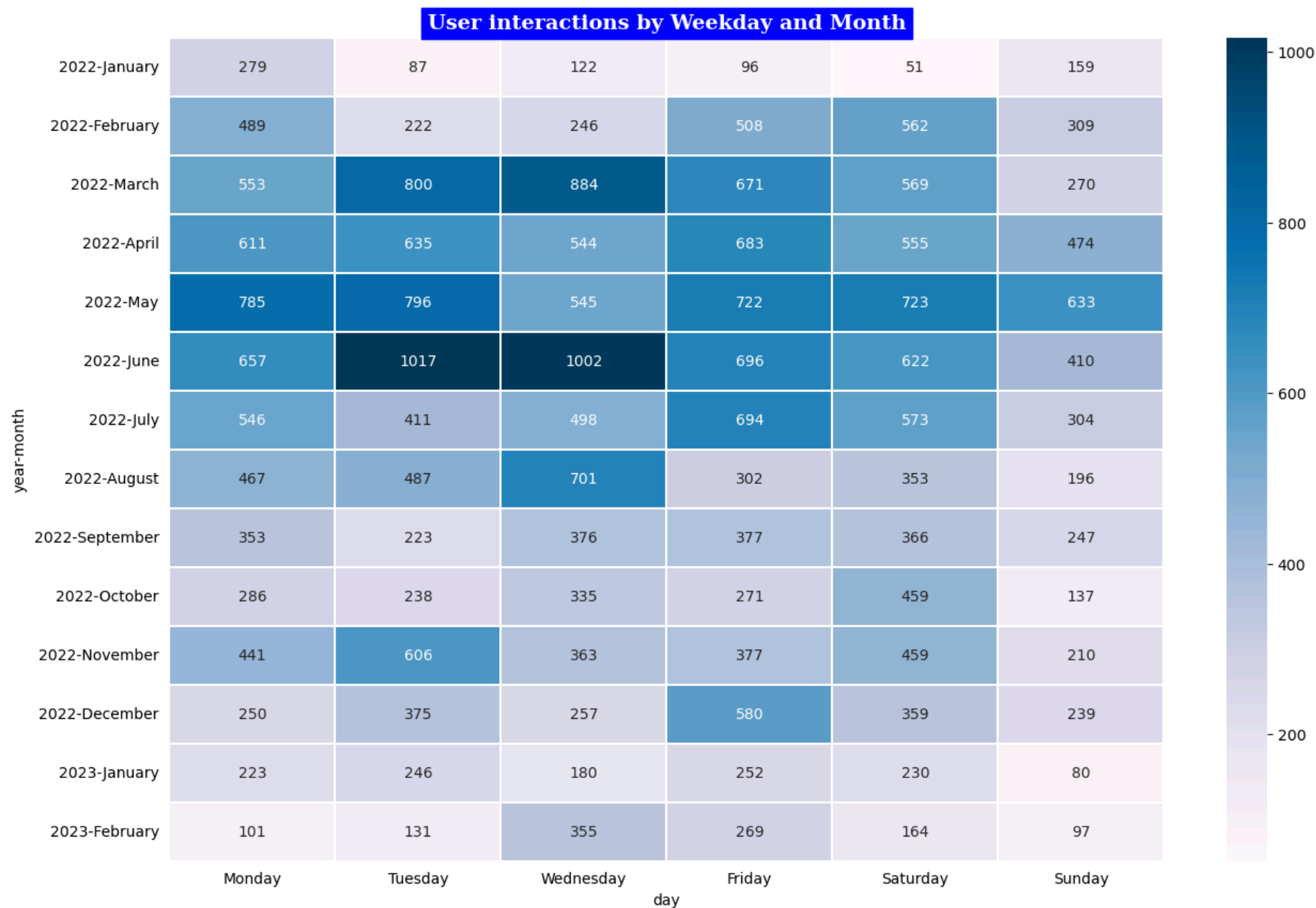
Out[160]:

	day	Monday	Tuesday	Wednesday	Friday	Saturday	Sunday
year	**month**						
2022	**January**	279	87	122	96	51	159
	February	489	222	246	508	562	309
	March	553	800	884	671	569	270
	April	611	635	544	683	555	474
	May	785	796	545	722	723	633
	June	657	1017	1002	696	622	410
	July	546	411	498	694	573	304
	August	467	487	701	302	353	196
	September	353	223	376	377	366	247
	October	286	238	335	271	459	137
	November	441	606	363	377	459	210
	December	250	375	257	580	359	239
2023	**January**	223	246	180	252	230	80
	February	101	131	355	269	164	97

```
In [173…
plt.figure(figsize=(15, 10))
plt.style.use('default')
plt.style.use('seaborn-v0_8-bright')
sns.heatmap(Monthly__user_interaction_pivot, cmap='PuBu',annot=True, fmt='d' , linewidth=0.1)
plt.title("User interactions by Weekday and Month",fontsize=14,fontfamily='serif',fontweight='bold',
          backgroundcolor='blue',color='w')
plt.tick_params(axis='both', which='both', left=False, bottom=False)
plt.show()
```

year-month	Monday	Tuesday	Wednesday	Friday	Saturday	Sunday
2022-January	279	87	122	96	51	159
2022-February	489	222	246	508	562	309
2022-March	553	800	884	671	569	270
2022-April	611	635	544	683	555	474
2022-May	785	796	545	722	723	633
2022-June	657	1017	1002	696	622	410
2022-July	546	411	498	694	573	304
2022-August	467	487	701	302	353	196
2022-September	353	223	376	377	366	247
2022-October	286	238	335	271	459	137
2022-November	441	606	363	377	459	210
2022-December	250	375	257	580	359	239
2023-January	223	246	180	252	230	80
2023-February	101	131	355	269	164	97

day

In [163…
```
df.sample()
```

Out[163]:

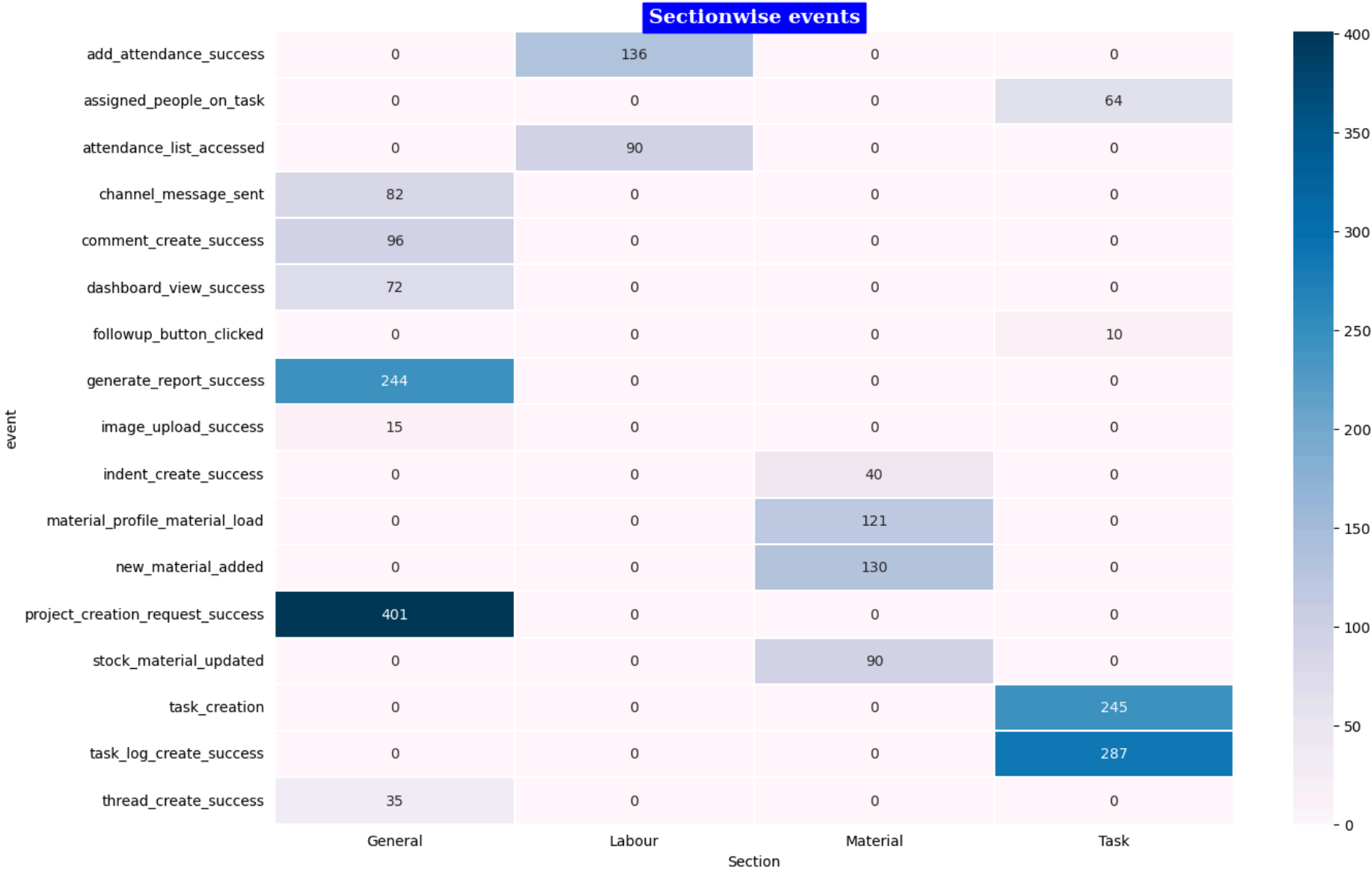|	created_at_time	event	org_id	project_id	user_id	Description	Section	month	year	day	mon
13449	2022-05-07 15:41:46	stock_material_updated	ORG400468153021	PRJ639384602336	USR939452321629	Updating Stock in the inventory	Material	May	2022	Saturday	

In [169…
```
Sectionwise_event = df.pivot_table(index='event', columns='Section', values='user_id', aggfunc=pd.Series.nunique).fillna(0).astyp
Sectionwise_event
```

Out[169]:

Section event	General	Labour	Material	Task
add_attendance_success	0	136	0	0
assigned_people_on_task	0	0	0	64
attendance_list_accessed	0	90	0	0
channel_message_sent	82	0	0	0
comment_create_success	96	0	0	0
dashboard_view_success	72	0	0	0
followup_button_clicked	0	0	0	10
generate_report_success	244	0	0	0
image_upload_success	15	0	0	0
indent_create_success	0	0	40	0
material_profile_material_load	0	0	121	0
new_material_added	0	0	130	0
project_creation_request_success	401	0	0	0
stock_material_updated	0	0	90	0
task_creation	0	0	0	245
task_log_create_success	0	0	0	287
thread_create_success	35	0	0	0

In [177…
```
plt.figure(figsize=(15, 10))
plt.style.use('default')
plt.style.use('seaborn-v0_8-bright')
sns.heatmap(Sectionwise_event, cmap='PuBu',annot=True, fmt='d' , linewidth=0.1)
plt.title('Sectionwise events',fontsize=14,fontfamily='serif',fontweight='bold',backgroundcolor='blue',color='w')
```

```
plt.tick_params(axis='both', which='both', left=False, bottom=False)
plt.show()
```

Sectionwise events

event	General	Labour	Material	Task
add_attendance_success	0	136	0	0
assigned_people_on_task	0	0	0	64
attendance_list_accessed	0	90	0	0
channel_message_sent	82	0	0	0
comment_create_success	96	0	0	0
dashboard_view_success	72	0	0	0
followup_button_clicked	0	0	0	10
generate_report_success	244	0	0	0
image_upload_success	15	0	0	0
indent_create_success	0	0	40	0
material_profile_material_load	0	0	121	0
new_material_added	0	0	130	0
project_creation_request_success	401	0	0	0
stock_material_updated	0	0	90	0
task_creation	0	0	0	245
task_log_create_success	0	0	0	287
thread_create_success	35	0	0	0

Section

In [179...
```
event_description = df.pivot_table(index='Description', columns='event', values='user_id', aggfunc=pd.Series.nunique).fillna(0).a
event_description
```
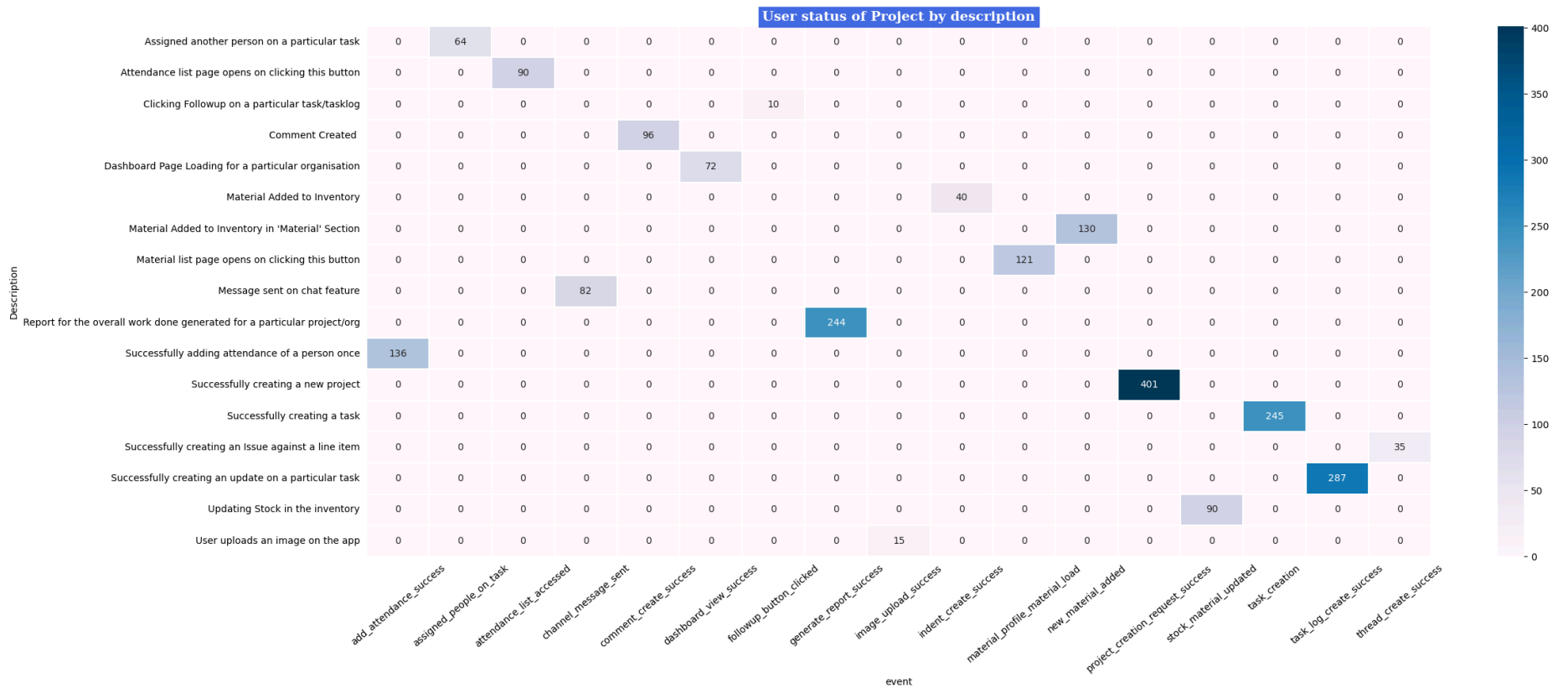
event Description	add_attendance_success	assigned_people_on_task	attendance_list_accessed	channel_message_sent	comment_create_success	dashboard_view_s
Assigned another person on a particular task	0	64	0	0	0	
Attendance list page opens on clicking this button	0	0	90	0	0	
Clicking Followup on a particular task/tasklog	0	0	0	0	0	
Comment Created	0	0	0	0	96	
Dashboard Page Loading for a particular organisation	0	0	0	0	0	
Material Added to Inventory	0	0	0	0	0	
Material Added to Inventory in 'Material' Section	0	0	0	0	0	
Material list page opens on clicking this button	0	0	0	0	0	
Message sent on chat feature	0	0	0	82	0	
Report for the overall work done generated for a particular project/org	0	0	0	0	0	
Successfully adding attendance of a person once	136	0	0	0	0	
Successfully creating a new project	0	0	0	0	0	
Successfully creating a task	0	0	0	0	0	
Successfully creating an Issue against a line item	0	0	0	0	0	
Successfully creating an update on a particular task	0	0	0	0	0	
Updating Stock in the inventory	0	0	0	0	0	
User uploads an image on the app	0	0	0	0	0	

In [188…
```
plt.figure(figsize=(25, 10))
plt.style.use('default')
plt.style.use('seaborn-v0_8-bright')
sns.heatmap(event_description, cmap='PuBu',annot=True, fmt='d' , linewidth=0.1)
```

```
plt.title('User status of Project by description',fontsize=14,fontfamily='serif',fontweight='bold',
          backgroundcolor='royalblue',color='w')
plt.tick_params(axis='both', which='both', left=False, bottom=False)
plt.xticks(rotation=40)
plt.show()
```


Additional exploration - on Tableau

link - https://public.tableau.com/app/profile/kasi.muthuveerappan/viz/powerplayassesment-set4/userinteractionbasedontheevents#1

✳️ Insights:

TimeFrame and Dataset Infographics:

- The data was given **417 days** dating from `Jan 2022 till Feb 2023`.

    User Engagement Metrics:

- There are `543` unique users , `386` unique organizations and `914 known Projects` with 141 data with unknown project_id interact with the app.
- User_d -> `USR509149973276` is the most frequent app user with 5438 events interactions
- Project_id -> `Prj256203650640` is the project with most unique users interacted with the app 5832 times.

    Time-based Patterns:

- Mostly was used during the month of `March till June` and users engagement gradually decreases.
- May be Because of the `seasonality` -> **summer** is most apt for construction purposes.
- `92 Organizations` with event description as `Successfully created the project` during **Feb-2022**
- `81 projects` interacted with app for `435 times` to update the event description as '***Sucessfully creating an update on a particular Task***' during the month *Feb-2022*.

    Event Frequency:

- The analysis of event descriptions and their impact on user interactions shows the following top 10 descriptions with unique user interactions:
    - 1. Successfully creating a new project: 401 unique users
    - 1. Successfully creating an update on a particular task: 287 unique users
    - 1. Successfully creating a task: 245 unique users
    - 1. Report for the overall work done generated for a particular project/org: 244 unique users
    - 1. Successfully adding attendance of a person once: 136 unique users

Event Sections Analysis:

- The No.of Events happend in each section:
    - Material section - 18787 events
    - Labour section - 8406 events
    - General Section - 7058 events
    - Task section - 6926 events
- **This tells us that Users interact with `Material Section` at an enormously higher rate compared to other sections through the App.**

User Feedback Analysis:

- If available, consider incorporating user feedback data to gain qualitative insights into user experiences and from organizations perspective to grow feasibly.

Trigger Identification:

- Patterns from timeframe indicates the there is `High User Engagement` during the **Summer Seasons** which is more opted by the consumers and therefore the the construction buisness hypes during the month the **march till july**.
- The Highest number of user interacting with the app mostly use the `Material Section` widely throughout the year and to communicate the status of the projects through the event description.
- `Quality Materials` correlates the `User satisfaction` which is the major trigger for making the organizations to becoming more engaged and active and some use for internal office communications.

- The `Powerplay App` is used extensively by the organization to deal with **Huge projects, status communication , material procurement, quality making and to attain customer satisfaction** .
- These Factors act as a **Major Triggers for the Poweplay App interaction**.