

## Matrix plots - Heat Maps

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

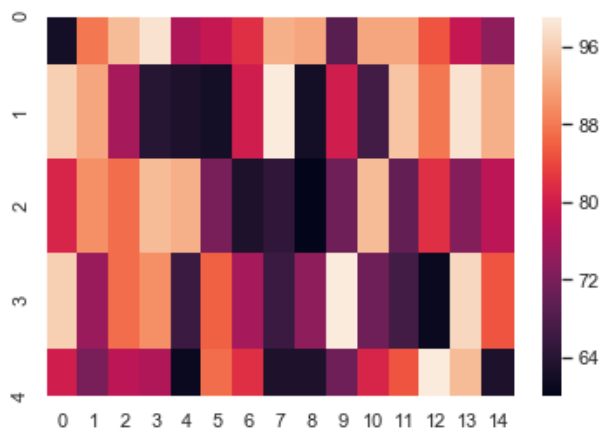
```
In [2]: # Set seaborn defaults

sns.set()
```

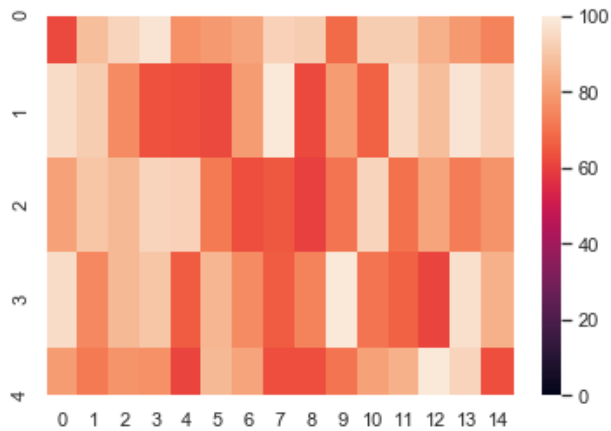
```
In [3]: np.random.seed(123)
uniform_data = np.random.randint(60,100,(5,15))
uniform_data
```

```
Out[3]: array([[62, 88, 94, 98, 77, 79, 82, 93, 92, 69, 92, 92, 85, 79, 74],
               [96, 92, 76, 64, 63, 62, 80, 99, 62, 80, 67, 95, 88, 98, 93],
               [81, 90, 87, 94, 93, 72, 63, 65, 60, 71, 94, 70, 82, 73, 78],
               [96, 75, 87, 90, 66, 86, 76, 66, 74, 99, 71, 67, 61, 97, 85],
               [80, 72, 78, 77, 61, 87, 82, 63, 63, 71, 81, 85, 99, 94, 63]])
```

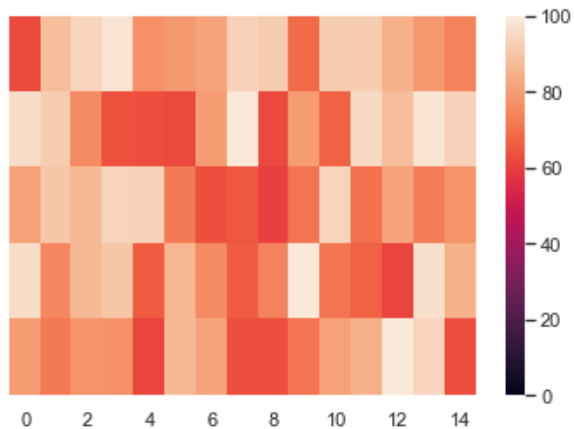
```
In [4]: sns.heatmap(uniform_data);
```



```
In [5]: sns.heatmap(uniform_data, vmin=0, vmax=100);
```



```
In [6]: sns.heatmap(uniform_data,
                    xticklabels=2, yticklabels=False,
                    vmin=0, vmax=100);
```



```
In [7]: uniform_data
```

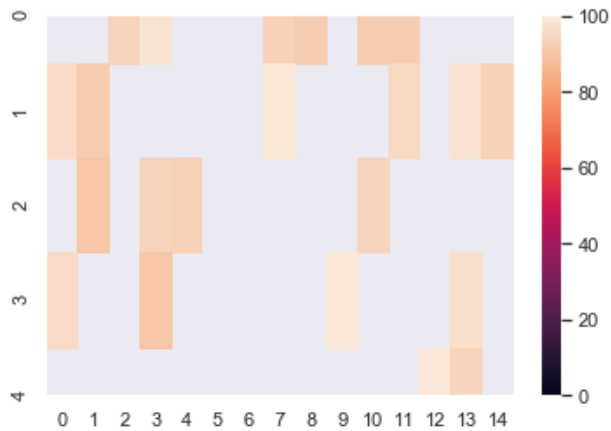
```
Out[7]: array([[62, 88, 94, 98, 77, 79, 82, 93, 92, 69, 92, 92, 85, 79, 74],
               [96, 92, 76, 64, 63, 62, 80, 99, 62, 80, 67, 95, 88, 98, 93],
               [81, 90, 87, 94, 93, 72, 63, 65, 60, 71, 94, 70, 82, 73, 78],
               [96, 75, 87, 90, 66, 86, 76, 66, 74, 99, 71, 67, 61, 97, 85],
               [80, 72, 78, 77, 61, 87, 82, 63, 63, 71, 81, 85, 99, 94, 63]])
```

```
In [8]: mask = np.where(uniform_data < 90, True, False)
        mask
```

```
Out[8]: array([[ True,  True, False, False,  True,  True,  True, False, False,
                True, False, False,  True,  True,  True],
               [False, False,  True,  True,  True,  True,  True, False,  True,
                True,  True, False,  True, False, False],
               [ True, False,  True, False, False,  True,  True,  True,  True,
                True, False,  True,  True,  True,  True],
               [False,  True,  True, False,  True,  True,  True,  True,  True,
                False,  True,  True,  True, False,  True],
               [ True,  True,  True,  True,  True,  True,  True,  True,  True,
                True,  True,  True, False, False,  True]])
```

```
In [9]: # Do not show data where mask is True

sns.heatmap(uniform_data, mask=mask, vmin=0, vmax=100);
```



```
In [10]: np.random.seed(123)
normal_data = np.round(100*np.random.randn(5,5))
normal_data
```

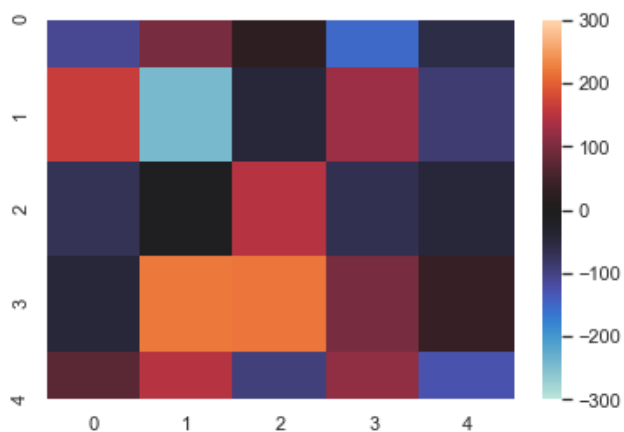
```
Out[10]: array([[ -109.,  100.,   28., -151.,  -58.],
 [ 165., -243.,  -43.,  127.,  -87.],
 [  -68.,   -9.,  149.,  -64.,  -44.],
 [  -43.,  221.,  219.,  100.,   39.],
 [   74.,  149.,  -94.,  118., -125.]])
```

```
In [11]: np.min(normal_data), np.max(normal_data)
```

```
Out[11]: (-243.0, 221.0)
```

```
In [12]: # Plot with heatmap centered on 0 with a diverging colormap

sns.heatmap(normal_data, center=0,
             vmin=-300, vmax=300);
```

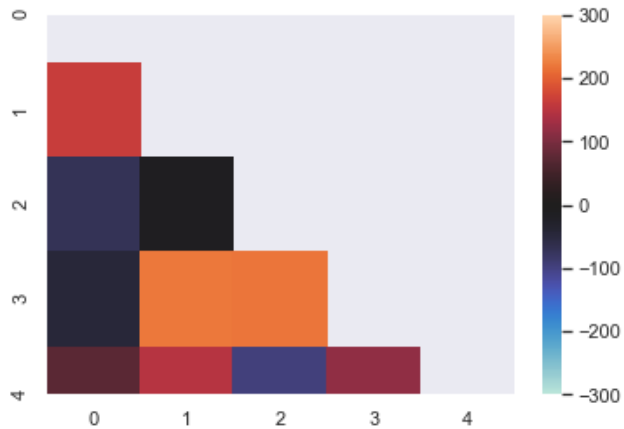


```
In [13]: # Mask Upper triangle
```

```
mask = np.zeros_like(normal_data)
mask[np.triu_indices_from(mask)] = True
mask
```

```
Out[13]: array([[1., 1., 1., 1., 1.],
               [0., 1., 1., 1., 1.],
               [0., 0., 1., 1., 1.],
               [0., 0., 0., 1., 1.],
               [0., 0., 0., 0., 1.]])
```

```
In [14]: sns.heatmap(normal_data, mask=mask, center=0,
                    vmin=-300, vmax=300);
```



```
In [15]: # Case study
```

```
flights = sns.load_dataset("flights")
flights.head()
```

```
Out[15]:
```

	year	month	passengers
0	1949	January	112
1	1949	February	118
2	1949	March	132
3	1949	April	129
4	1949	May	121

```
In [16]: flights.count()
```

```
Out[16]: year          144
month          144
passengers     144
dtype: int64
```

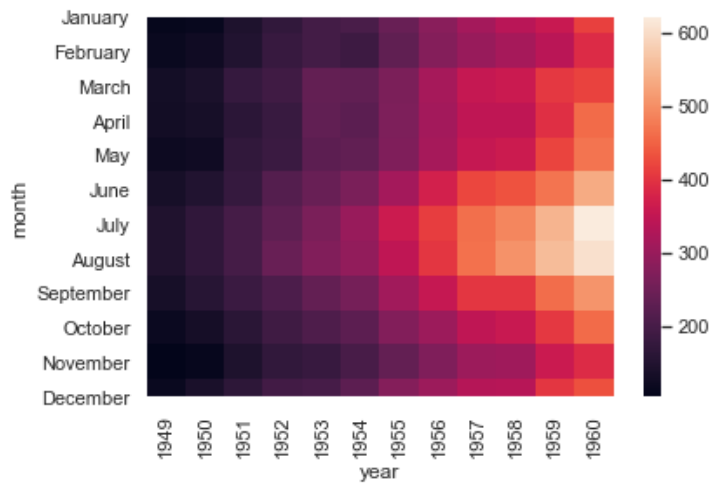
```
In [17]: # Convert to wide form
```

```
flights = flights.pivot("month", "year", "passengers")
flights
```

```
Out[17]:
```

	year	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
month													
January		112	115	145	171	196	204	242	284	315	340	360	417
February		118	126	150	180	196	188	233	277	301	318	342	391
March		132	141	178	193	236	235	267	317	356	362	406	419
April		129	135	163	181	235	227	269	313	348	348	396	461
May		121	125	172	183	229	234	270	318	355	363	420	472
June		135	149	178	218	243	264	315	374	422	435	472	535
July		148	170	199	230	264	302	364	413	465	491	548	622
August		148	170	199	242	272	293	347	405	467	505	559	606
September		136	158	184	209	237	259	312	355	404	404	463	508
October		119	133	162	191	211	229	274	306	347	359	407	461
November		104	114	146	172	180	203	237	271	305	310	362	390
December		118	140	166	194	201	229	278	306	336	337	405	432

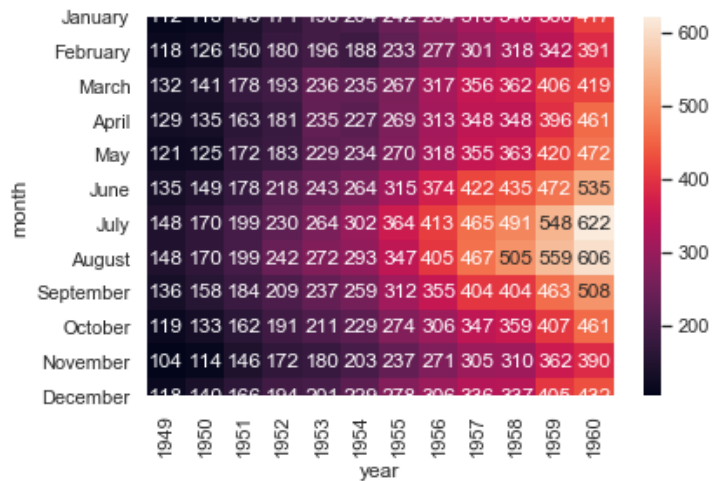
```
In [18]: sns.heatmap(flights);
```



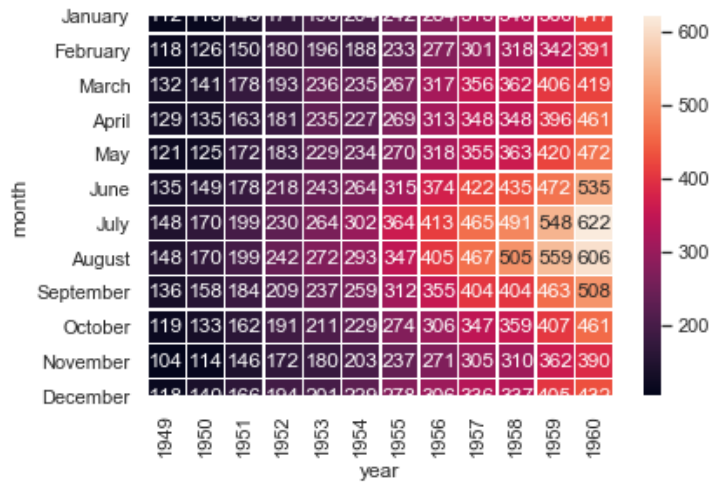
```
In [19]: sns.heatmap(flights, cmap="YlGnBu");
```



```
In [20]: sns.heatmap(flights, annot=True, fmt="d");
```



```
In [21]: sns.heatmap(flights, annot=True, fmt="d", linewidths=0.4);
```



```
In [22]: # Bug fix to show cut off portions of top and bottom

fig, ax = plt.subplots(figsize=(9, 6))

sns.heatmap(flights, annot=True, fmt="d", linewidths=0.4, ax=ax)

bottom_y, top_y = plt.ylim()
bottom_y += 0.5
top_y -= 0.5
plt.ylim(bottom_y, top_y)

plt.show()
```



In [ ]: