In [1]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import warnings
warnings.filterwarnings("ignore")
import os
```

In [3]:
```
cwd = os.getcwd()
df = pd.read_csv(cwd + "/customer_booking.csv", encoding = "ISO-8859-1")
```

In [4]:
```
df.head()
```

Out[4]:

	num_passengers	sales_channel	trip_type	purchase_lead	length_of_stay	flight_hour	flight_day	
0	2	Internet	RoundTrip	262	19	7	Sat	AK
1	1	Internet	RoundTrip	112	20	3	Sat	AK
2	2	Internet	RoundTrip	243	22	17	Wed	AK
3	1	Internet	RoundTrip	96	31	4	Sat	AK
4	2	Internet	RoundTrip	68	22	15	Wed	AK

In [6]:
```
df.shape
```

Out[6]:
```
(50000, 14)
```

In [7]:
```
df.describe()
```

Out[7]:

	num_passengers	purchase_lead	length_of_stay	flight_hour	wants_extra_baggage	wants_prefer
count	50000.000000	50000.000000	50000.00000	50000.00000	50000.000000	5000
mean	1.591240	84.940480	23.04456	9.06634	0.668780	
std	1.020165	90.451378	33.88767	5.41266	0.470657	
min	1.000000	0.000000	0.00000	0.00000	0.000000	
25%	1.000000	21.000000	5.00000	5.00000	0.000000	
50%	1.000000	51.000000	17.00000	9.00000	1.000000	
75%	2.000000	115.000000	28.00000	13.00000	1.000000	
max	9.000000	867.000000	778.00000	23.00000	1.000000	

In [8]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 50000 entries, 0 to 49999
Data columns (total 14 columns):
 #   Column                 Non-Null Count  Dtype  
---  ------                 --------------  -----  
 0   num_passengers         50000 non-null  int64  
 1   sales_channel          50000 non-null  object 
 2   trip_type              50000 non-null  object 
 3   purchase_lead          50000 non-null  int64  
 4   length_of_stay         50000 non-null  int64  
 5   flight_hour            50000 non-null  int64  
 6   flight_day             50000 non-null  object 
 7   route                  50000 non-null  object 
 8   booking_origin         50000 non-null  object 
 9   wants_extra_baggage    50000 non-null  int64  
 10  wants_preferred_seat   50000 non-null  int64  
 11  wants_in_flight_meals  50000 non-null  int64  
 12  flight_duration        50000 non-null  float64
 13  booking_complete       50000 non-null  int64  
dtypes: float64(1), int64(8), object(5)
memory usage: 5.3+ MB
```

In [12]:
```
df.isna().sum()
```

Out[12]:
```
num_passengers           0
sales_channel            0
trip_type                0
purchase_lead            0
length_of_stay           0
flight_hour              0
flight_day               0
route                    0
booking_origin           0
wants_extra_baggage      0
wants_preferred_seat     0
wants_in_flight_meals    0
flight_duration          0
booking_complete         0
dtype: int64
```

Sales Channel

In [18]:
```
df.sales_channel.value_counts()
```

Out[18]:
```
Internet    44382
Mobile       5618
Name: sales_channel, dtype: int64
```

In [19]:
```
per_internet = df.sales_channel.value_counts().values[0]/df.sales_channel.count()*10
```

In [20]:
```
per_internet
```

Out[20]:
```
88.764
```

In [21]:
```
per_mobile = df.sales_channel.value_counts().values[1] / df.sales_channel.count()*10
```

In [22]:
```
per_mobile
```

Out[22]:
```
11.236
```

As per the sales_channel column flight booking type is divided into 2 parts : -

internet:- 88.764

mobile :- 11.236

Trip Type

In [24]:
```
df.trip_type.value_counts()
```

Out[24]:
```
RoundTrip     49497
OneWay          387
CircleTrip      116
Name: trip_type, dtype: int64
```

In [25]:
```
per_round = df.trip_type.value_counts().values[0]/ df.trip_type.count() *100
per_oneway = df.trip_type.value_counts().values[1]/ df.trip_type.count() *100
per_circle = df.trip_type.value_counts().values[2]/ df.trip_type.count() *100
```

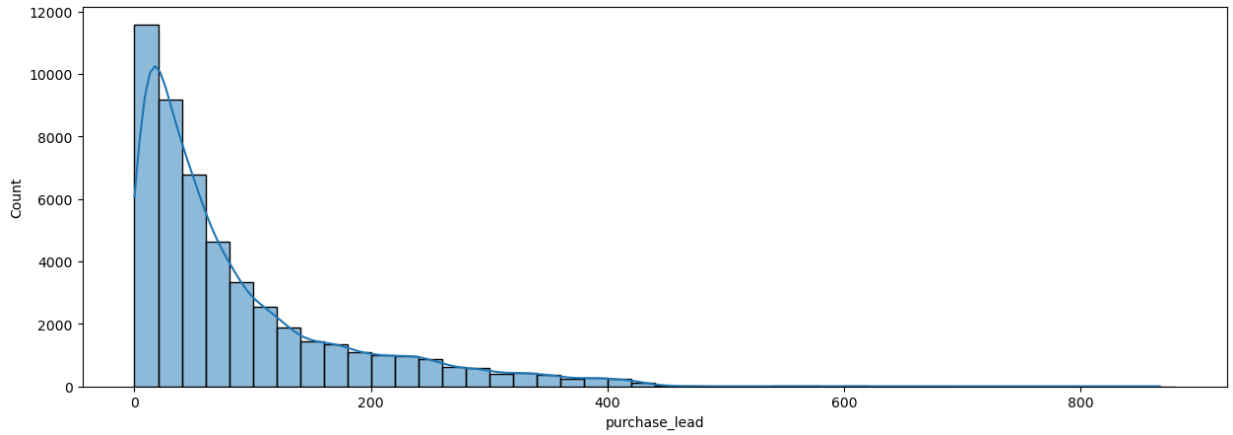
In [26]:
```
print(f"Percentage of round trips: {per_round} %")
print(f"Percentage of One way trips: {per_oneway} %")
print(f"Percentage of circle trips: {per_circle} %")
```

```
Percentage of round trips: 98.994 %
Percentage of One way trips: 0.774 %
Percentage of circle trips: 0.232 %
```

Purchase Lead

In [27]:
```
plt.figure(figsize=(15,5))
sns.histplot(data=df,x = "purchase_lead",binwidth = 20, kde = True)
```

Out[27]:
```
<AxesSubplot:xlabel='purchase_lead', ylabel='Count'>
```



There are few bookings that were done more that 2 years before the travel date and it seems very unlikely that book that in advance. However, it might also be because of the cancellation and rebooking in a peiod of 6 months for twice. Generally airline keep the tickets for rebooking within a year. But at this point we will consider them as outliers which will effect the results of predictive model in a huge way.

In [28]:
```
(df.purchase_lead >600).value_counts()
```

Out[28]:
```
False    49992
True         8
Name: purchase_lead, dtype: int64
```

In [29]:
```
df[df.purchase_lead > 600]
```

Out[29]:

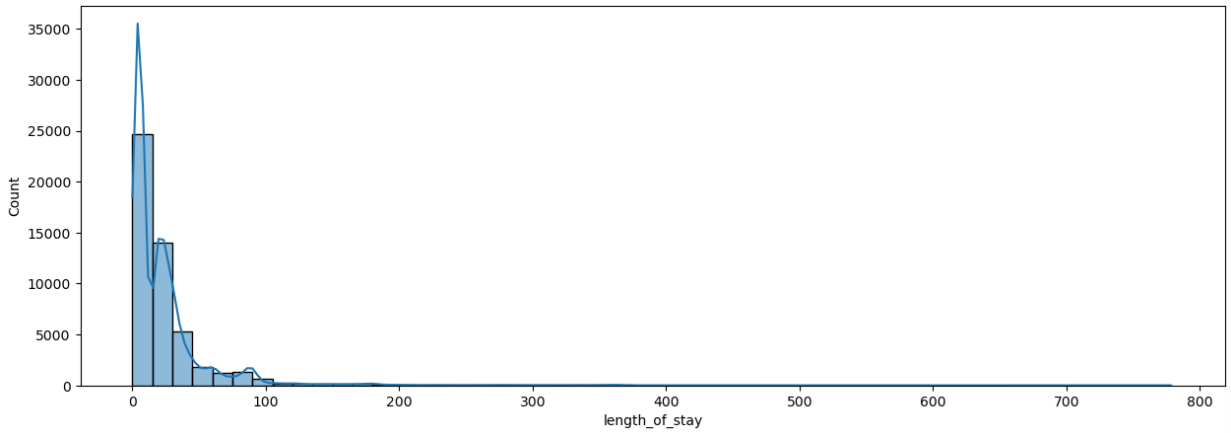
	num_passengers	sales_channel	trip_type	purchase_lead	length_of_stay	flight_hour	flight_day
835	3	Internet	RoundTrip	641	46	6	Sun
6148	1	Internet	RoundTrip	614	19	11	Wed
24119	1	Internet	RoundTrip	704	23	8	Tue
38356	2	Internet	RoundTrip	633	5	10	Sat
39417	1	Mobile	RoundTrip	625	5	15	Fri
42916	1	Mobile	RoundTrip	605	6	18	Thu
46716	2	Internet	RoundTrip	606	6	6	Fri
48259	3	Internet	RoundTrip	867	6	7	Mon

In [30]:
```
#filtering the data to have only purchase lead days less than 600 days
df = df[df.purchase_lead <600 ]
```

Length Of Stay

In [31]:
```
plt.figure(figsize=(15,5))
sns.histplot(data=df, x="length_of_stay", binwidth=15,kde=True)
```

Out[31]: <AxesSubplot:xlabel='length_of_stay', ylabel='Count'>



Let's see how many entries do we have that exceeds length of stay more than 100 days.

In [33]:
```
(df.length_of_stay> 200).value_counts()
```

Out[33]:
```
False    49713
True       279
Name: length_of_stay, dtype: int64
```

In [34]:
```
df[df.length_of_stay> 500].booking_complete.value_counts()
```

Out[34]:
```
0    9
1    1
Name: booking_complete, dtype: int64
```

We need to have more business knowledge to decide whether to remove these entries with more than 600 days of stay. There are could be many reasons for such bookings. But for now, we will just want to focus on bookings done for length of stay less than 500 days.

In [35]:
```
#filtering the data to have only length of stay days less than 500 days
df = df[df.purchase_lead <500 ]
```

Flight Day

We will map the flight day with a number of a week.

In [36]:
```
mapping = {
    "Mon" : 1,
    "Tue" : 2,
    "Wed" : 3,
    "Thu" : 4,
    "Fri" : 5,
    "Sat" : 6,
    "Sun" : 7
}

df.flight_day = df.flight_day.map(mapping)
```

In [37]:
```
df.flight_day.value_counts()
```

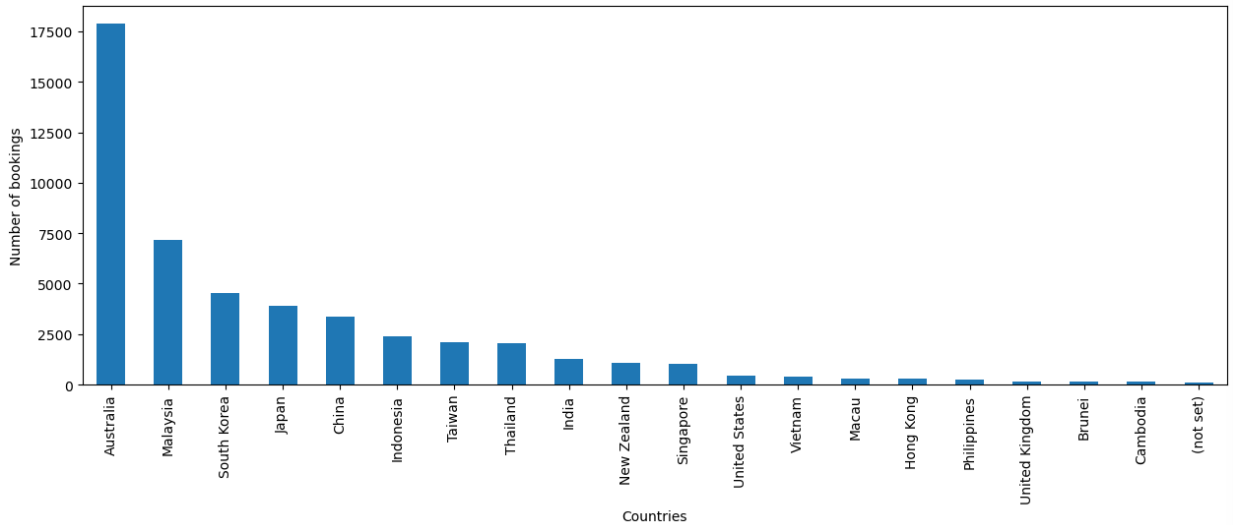
Out[37]:
```
1    8100
3    7671
2    7670
4    7423
5    6759
7    6550
6    5809
Name: flight_day, dtype: int64
```

Most of the customers want to travel on Monday and choose Saturday as least preffered day as flight day.

Booking Origin

In [39]:
```
plt.figure(figsize=(15,5))
ax = df.booking_origin.value_counts()[:20].plot(kind="bar")
ax.set_xlabel("Countries")
ax.set_ylabel("Number of bookings")
```

Out[39]:
```
Text(0, 0.5, 'Number of bookings')
```



In [41]:
```
successful_booking_per = df.booking_complete.value_counts().values[0] / len(df) * 10
```

In [42]:
```
unsuccessful_booking_per = 100-successful_booking_per
```

In [43]:
```
print(f"Out of 50000 booking entries only {round(unsuccessful_booking_per,2)} % book
```

```
Out of 50000 booking entries only 14.96 % bookings were successfull or complete.
```

Export the dataset to csv

In [44]:
```
df.to_csv(cwd + "/filtered_customer_booking.csv")
```

In [ ]:
```

```