

```
import pandas as pd
import numpy as np

exam_data = {
    'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],
    'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],
    'attempts': [1, 3, 4, 3, 5, 3, 6, 1, 7, 1]
}
```

```
df = pd.DataFrame(exam_data)
```

```
selected_columns = df[['name', 'score']]
```

```
print(selected_columns)
```

```
↗
```

	name	score
0	Anastasia	12.5
1	Dima	9.0
2	Katherine	16.5
3	James	NaN
4	Emily	9.0
5	Michael	20.0
6	Matthew	14.5
7	Laura	NaN
8	Kevin	8.0
9	Jonas	19.0

```
import pandas as pd
import numpy as np
```

```
exam_data = {
    'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],
    'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],
    'attempts': [1, 3, 4, 3, 5, 3, 6, 1, 7, 1]
}
```

```
df = pd.DataFrame(exam_data)
```

```
filtered_data = df[df['attempts'] > 3]
```

```
print(filtered_data)
```

```
↗
```

	name	score	attempts
2	Katherine	16.5	4
4	Emily	9.0	5
6	Matthew	14.5	6
8	Kevin	8.0	7

```
import pandas as pd
```

```
data = {
    'name': ['Alice', 'Bob', 'Charlie', 'Dave'],
    'age': [25, 35, 40, 28],
    'gender': ['F', 'M', 'M', 'M'],
    'salary': [50000, 70000, 60000, 80000]
}
```

```
df = pd.DataFrame(data)
```

```
rows_age_above_30 = df[df['age'] > 30]
print(rows_age_above_30, "\n")
```

```
rows_name_contains_e = df[df['name'].str.contains('e', case=False, na=False)]
print(rows_name_contains_e, "\n")
```

```
rows_male_high_salary = df[(df['gender'] == 'M') & (df['salary'] > 65000)]
print(rows_male_high_salary, "\n")
```

```
selected_columns = df[['name', 'age']]
```

```
print(selected_columns)
```

```
↵
   name  age gender  salary
1   Bob   35      M   70000
2 Charlie   40      M   60000
```

```
   name  age gender  salary
0  Alice   25      F   50000
2 Charlie   40      M   60000
3   Dave   28      M   80000
```

```
   name  age gender  salary
1   Bob   35      M   70000
3   Dave   28      M   80000
```

```
   name  age
0  Alice   25
1   Bob   35
2 Charlie   40
3   Dave   28
```

```
import pandas as pd
from google.colab import files
```

```
uploaded = files.upload()
df = pd.read_csv('bank_train.csv')
```

```
primary_edu_deposit = df.loc[(df['education'] == 'primary') & (df['deposit'] == 'yes')]
not_subscribed = df.loc[df['deposit'] == 'no']
subscribed_with_loan = df.loc[(df['deposit'] == 'yes') & ((df['housing'] == 'yes') | (df['loan'] == 'yes'))]
secondary_edu_not_subscribed = df.loc[(df['education'] == 'secondary') & (df['deposit'] == 'no')]
successful_campaign = df.loc[(df['deposit'] == 'yes') & (df['outcome'] == 'success')]
unemployed_not_subscribed = df.loc[(df['job'] == 'unemployed') & (df['deposit'] == 'no')]
age_below_30 = df.loc[df['age'] <= 30, ['age', 'balance']]
```

```
print("Clients with primary education who subscribed to a deposit:")
print(primary_edu_deposit, "\n")
```

```
print("Clients who have not subscribed to a deposit:")
print(not_subscribed, "\n")
```


```
print("Clients who subscribed to a deposit and have either a housing or personal loan:")
print(subscribed_with_loan, "\n")
```

```
print("Clients with secondary education who have not subscribed to a deposit:")
print(secondary_edu_not_subscribed, "\n")
```

```
print("Clients who subscribed to a deposit as a result of a successful marketing campaign:")
print(successful_campaign, "\n")
```

```
print("Unemployed clients who have not subscribed to a deposit:")
print(unemployed_not_subscribed, "\n")
```

```
print("Columns 'age' and 'balance' where age is less than or equal to 30:")
print(age_below_30, "\n")
```

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enable.

Saving bank_train.csv to bank_train (2).csv

Clients with primary education who subscribed to a deposit:

	age	job	marital	education	default	balance	housing	loan	\
29	39	blue-collar	divorced	primary	no	1317.0	yes	no	
39	31	unemployed	single	primary	no	163.0	no	no	
56	49	blue-collar	single	primary	no	566.0	yes	no	
66	53	blue-collar	married	primary	yes	-462.0	no	no	
103	42	blue-collar	single	primary	no	4930.0	no	no	
...	
4411	55	housemaid	married	primary	no	0.0	yes	no	
4422	80	retired	married	primary	no	1468.0	no	no	
4451	41	blue-collar	married	primary	no	143.0	yes	yes	
4452	53	blue-collar	married	primary	no	421.0	yes	no	
4458	32	blue-collar	married	primary	no	-454.0	yes	yes	

	contact	day	month	duration	campaign	pdays	previous	poutcome	\
29	cellular	20	nov	543	1	170	4	other	
39	cellular	30	jan	707	2	2	1	other	
56	cellular	25	jul	979	2	-1	0	unknown	
66	cellular	29	jan	470	1	-1	0	unknown	
103	unknown	18	jun	973	1	-1	0	unknown	
...	
4411	cellular	17	jul	1303	2	-1	0	unknown	
4422	cellular	13	jan	330	3	-1	0	unknown	
4451	unknown	2	jun	659	2	-1	0	unknown	
4452	cellular	20	nov	677	1	-1	0	unknown	
4458	cellular	18	may	801	5	355	2	failure	

deposit

29	yes
39	yes
56	yes
66	yes
103	yes
...	...
4411	yes
4422	yes
4451	yes
4452	yes
4458	yes

[243 rows x 17 columns]

Clients who have not subscribed to a deposit:

	age	job	marital	education	default	balance	housing	loan	\
0	76	retired	married	secondary	no	2302.0	no	no	
3	41	blue-collar	married	secondary	no	356.0	yes	no	
6	59	retired	married	secondary	no	136.0	no	no	
7	34	blue-collar	married	primary	no	5299.0	yes	no	
9	44	blue-collar	married	secondary	no	879.0	yes	no	
...	
4457	43	management	married	tertiary	no	1336.0	yes	yes	
4460	54	retired	married	secondary	no	522.0	no	yes	
4461	33	management	married	tertiary	no	133.0	yes	no	
4464	31	technician	single	secondary	no	628.0	yes	no	
4465	70	retired	divorced	primary	no	383.0	no	no	

	contact	day	month	duration	campaign	pdays	previous	poutcome	\
0	telephone	5	feb	110	1	87	2	failure	
3	cellular	14	may	90	5	-1	0	unknown	
6	cellular	6	aug	301	4	-1	0	unknown	
7	unknown	26	jun	75	5	-1	0	unknown	
9	cellular	3	apr	383	1	-1	0	unknown	
...	
4457	cellular	27	may	82	2	309	1	failure	
4460	cellular	14	jul	81	3	-1	0	unknown	
4461	unknown	26	may	308	4	-1	0	unknown	
4464	unknown	12	may	1083	2	-1	0	unknown	
4465	cellular	28	apr	50	2	-1	0	unknown	

deposit

0	no
3	no
6	no
7	no
9	no
...	...
4457	no
4460	no
4461	no
4464	no
4465	no

[2354 rows x 17 columns]

Clients who subscribed to a deposit and have either a housing or personal loan:

	age	job	marital	education	default	balance	housing	loan	\
2	51	management	married	tertiary	no	2455.0	yes	no	
4	51	technician	married	secondary	no	-1944.0	yes	no	
15	37	management	single	tertiary	no	455.0	yes	no	
17	24	admin.	single	tertiary	no	0.0	yes	no	
21	33	admin.	married	tertiary	no	79.0	yes	no	
...	
4454	30	blue-collar	single	secondary	no	155.0	yes	yes	
4458	32	blue-collar	married	primary	no	-454.0	yes	yes	
4459	37	technician	single	secondary	no	3326.0	yes	no	
4462	39	services	divorced	secondary	no	687.0	yes	no	
4463	40	admin.	single	secondary	no	2040.0	yes	no	

	contact	day	month	duration	campaign	pdays	previous	poutcome	\
2	cellular	21	jul	553	1	-1	0	unknown	
4	cellular	7	may	623	1	-1	0	unknown	
15	cellular	13	aug	904	6	-1	0	unknown	
17	cellular	27	may	122	2	-1	0	unknown	
21	cellular	5	may	389	1	195	4	success	
...	
4454	cellular	9	jul	1426	3	-1	0	unknown	
4458	cellular	18	may	801	5	355	2	failure	
4459	unknown	21	may	799	1	-1	0	unknown	
4462	cellular	9	jul	869	1	-1	0	unknown	
4463	cellular	18	may	906	2	350	2	failure	

	deposit
2	yes
4	yes
15	yes
17	yes
21	yes
...	...
4454	yes
4458	yes
4459	yes
4462	yes
4463	yes

[893 rows x 17 columns]

Clients with secondary education who have not subscribed to a deposit:

	age	job	marital	education	default	balance	housing	loan	\
0	76	retired	married	secondary	no	2302.0	no	no	
3	41	blue-collar	married	secondary	no	356.0	yes	no	
6	59	retired	married	secondary	no	136.0	no	no	
9	44	blue-collar	married	secondary	no	879.0	yes	no	
10	34	services	married	secondary	no	1637.0	yes	no	
...	
4446	35	services	married	secondary	no	0.0	yes	no	
4453	31	services	married	secondary	no	505.0	no	no	
4456	54	blue-collar	married	secondary	no	-102.0	yes	no	
4460	54	retired	married	secondary	no	522.0	no	yes	
4464	31	technician	single	secondary	no	628.0	yes	no	

	contact	day	month	duration	campaign	pdays	previous	poutcome	\
0	telephone	5	feb	110	1	87	2	failure	
3	cellular	14	may	90	5	-1	0	unknown	
6	cellular	6	aug	301	4	-1	0	unknown	
9	cellular	3	apr	383	1	-1	0	unknown	
10	cellular	21	nov	107	4	-1	0	unknown	
...	
4446	cellular	24	jul	810	1	-1	0	unknown	
4453	cellular	11	jul	773	3	-1	0	unknown	
4456	cellular	27	aug	164	7	-1	0	unknown	
4460	cellular	14	jul	81	3	-1	0	unknown	
4464	unknown	12	may	1083	2	-1	0	unknown	

	deposit
0	no
3	no
6	no
9	no
10	no
...	...
4446	no
4453	no
4456	no
4460	no
4464	no

[1229 rows x 17 columns]

Clients who subscribed to a deposit as a result of a successful marketing campaign:

	age	job	marital	education	default	balance	housing	loan	\
19	76	self-employed	married	unknown	no	4984.0	no	no	
21	33	admin.	married	tertiary	no	79.0	yes	no	
45	71	retired	divorced	secondary	no	0.0	no	no	
51	68	retired	married	secondary	no	1146.0	no	no	
52	46	management	married	tertiary	no	273.0	yes	no	
...	
4338	38	admin.	divorced	secondary	no	19.0	yes	no	
4372	20	student	single	secondary	no	215.0	no	no	
4376	42	technician	married	secondary	no	994.0	yes	no	
4408	29	housemaid	single	tertiary	no	19.0	no	no	
4448	27	blue-collar	single	secondary	no	535.0	no	no	

	contact	day	month	duration	campaign	pdays	previous	outcome	\
19	telephone	28	apr	403	1	182	1	success	
21	cellular	5	may	389	1	195	4	success	
45	cellular	26	feb	771	1	171	1	success	
51	cellular	13	may	356	1	71	5	success	
52	cellular	18	mar	910	2	184	4	success	
...	
4338	cellular	5	feb	1130	3	251	2	success	
4372	cellular	24	feb	175	1	92	6	success	
4376	cellular	12	nov	227	3	93	6	success	
4408	cellular	4	may	268	1	88	4	success	
4448	cellular	16	aug	265	3	95	4	success	

	deposit
19	yes
21	yes
45	yes
51	yes
52	yes
...	...
4338	yes
4372	yes
4376	yes
4408	yes
4448	yes

[392 rows x 17 columns]

Unemployed clients who have not subscribed to a deposit:

	age	job	marital	education	default	balance	housing	loan	\
74	37	unemployed	single	secondary	no	48.0	no	no	
304	48	unemployed	married	secondary	no	855.0	yes	no	
404	57	unemployed	married	primary	no	0.0	yes	no	
464	47	unemployed	divorced	secondary	no	947.0	no	no	
494	45	unemployed	married	tertiary	no	1148.0	no	no	
550	55	unemployed	married	primary	no	8585.0	no	no	
644	35	unemployed	single	secondary	no	2116.0	yes	no	
690	31	unemployed	single	unknown	no	167.0	no	no	
705	42	unemployed	divorced	secondary	no	759.0	no	no	
811	38	unemployed	married	secondary	no	995.0	no	no	
821	43	unemployed	married	secondary	no	1943.0	yes	no	
827	52	unemployed	married	secondary	no	1639.0	no	no	
856	31	unemployed	married	secondary	no	20.0	no	no	
966	42	unemployed	married	secondary	no	-165.0	yes	yes	
967	57	unemployed	married	secondary	no	1350.0	no	no	
1003	35	unemployed	married	secondary	no	2080.0	yes	no	
1123	50	unemployed	married	secondary	no	3478.0	yes	no	
1236	43	unemployed	divorced	secondary	no	1854.0	no	no	
1351	38	unemployed	divorced	secondary	no	189.0	yes	yes	
1424	40	unemployed	divorced	secondary	no	262.0	yes	no	
1633	41	unemployed	single	tertiary	no	4517.0	yes	no	
1828	31	unemployed	single	secondary	no	209.0	yes	no	
1848	41	unemployed	married	primary	no	183.0	yes	no	
1850	30	unemployed	married	secondary	no	142.0	yes	no	
1961	58	unemployed	married	secondary	no	610.0	yes	no	
2060	33	unemployed	single	secondary	no	233.0	yes	no	
2184	41	unemployed	divorced	secondary	no	271.0	yes	no	
2292	40	unemployed	married	secondary	no	1289.0	no	no	
2308	50	unemployed	married	secondary	no	297.0	yes	no	
2364	43	unemployed	married	secondary	no	553.0	no	no	
2464	55	unemployed	married	primary	no	1221.0	no	yes	
2513	55	unemployed	married	secondary	no	512.0	no	no	
2603	33	unemployed	single	secondary	no	682.0	no	no	
2681	40	unemployed	married	tertiary	no	2430.0	no	no	
2699	52	unemployed	married	tertiary	no	2133.0	no	yes	
2754	55	unemployed	married	tertiary	no	5345.0	no	no	
2762	43	unemployed	married	secondary	no	775.0	no	no	
2827	54	unemployed	single	secondary	no	3611.0	yes	no	
2913	44	unemployed	married	primary	no	97.0	yes	no	

2929	44	unemployed	married	primary	no	37.0	yes	no
3145	36	unemployed	married	secondary	no	1077.0	yes	yes
3263	47	unemployed	single	secondary	no	439.0	yes	no
3313	45	unemployed	single	secondary	no	4819.0	no	no
3556	40	unemployed	married	secondary	no	382.0	yes	yes
3704	59	unemployed	single	secondary	no	219.0	yes	no
3733	46	unemployed	divorced	secondary	no	865.0	no	no
3745	58	unemployed	single	tertiary	no	0.0	no	no
3905	33	unemployed	married	tertiary	no	2094.0	no	no
3949	46	unemployed	married	secondary	no	3335.0	no	no
4027	36	unemployed	single	tertiary	no	2940.0	yes	no
4066	42	unemployed	married	tertiary	no	221.0	no	no
4102	30	unemployed	single	secondary	no	0.0	no	no
4125	27	unemployed	single	tertiary	no	0.0	yes	no
4130	34	unemployed	married	secondary	no	3060.0	no	no
4140	37	unemployed	married	secondary	no	200.0	yes	no
4179	43	unemployed	divorced	secondary	no	4769.0	no	no
4181	46	unemployed	married	secondary	no	0.0	yes	no
4271	49	unemployed	married	secondary	no	16397.0	no	no
4289	27	unemployed	single	secondary	no	13818.0	no	no
4395	26	unemployed	married	secondary	no	0.0	yes	no
					no	285.0	yes	no

	contact	day	month	duration	campaign	pdays	previous	outcome	\
74	cellular	31	jul	40	10	-1	0	unknown	
304	unknown	9	may	241	2	-1	0	unknown	
404	cellular	20	nov	231	2	-1	0	unknown	
464	cellular	5	feb	124	2	-1	0	unknown	
494	cellular	19	nov	782	2	-1	0	unknown	
550	telephone	28	jan	201	2	-1	0	unknown	
644	cellular	13	may	409	2	-1	0	unknown	
690	cellular	20	nov	316	1	-1	0	unknown	
705	cellular	28	jan	97	1	169	3	failure	
811	unknown	26	jul	84	1	-1	0	unknown	
821	cellular	18	nov	202	2	-1	0	unknown	
827	cellular	8	aug	93	1	-1	0	unknown	
856	telephone	18	nov	52	1	-1	0	unknown	
966	unknown	27	may	179	3	-1	0	unknown	
967	cellular	25	jun	131	1	388	1	failure	
1003	telephone	14	apr	266	3	-1	0	unknown	
1123	unknown	13	may	342	3	-1	0	unknown	
1236	cellular	13	nov	131	2	197	1	success	
1351	cellular	21	jul	105	2	-1	0	unknown	
1424	unknown	14	may	163	5	-1	0	unknown	
1633	cellular	20	nov	137	1	-1	0	unknown	
1828	cellular	6	may	193	1	-1	0	unknown	
1848	cellular	29	jul	271	1	-1	0	unknown	
1850	unknown	20	may	350	4	-1	0	unknown	
1961	telephone	29	jul	246	2	-1	0	unknown	
2060	unknown	8	may	221	4	-1	0	unknown	
2184	unknown	19	jun	196	2	-1	0	unknown	
2292	cellular	26	may	260	2	-1	0	unknown	
2308	cellular	31	jul	29	10	-1	0	unknown	
2364	telephone	4	feb	125	1	-1	0	unknown	
2464	cellular	8	jul	108	1	-1	0	unknown	
2513	cellular	28	jan	70	1	-1	0	unknown	
2603	cellular	5	feb	251	1	-1	0	unknown	
2681	cellular	24	aug	87	2	-1	0	unknown	
2699	cellular	18	jul	90	1	-1	0	unknown	
2754	unknown	6	may	278	1	-1	0	unknown	
2762	cellular	14	aug	98	1	106	1	failure	
2827	cellular	5	feb	81	1	-1	0	unknown	
2913	unknown	5	jun	105	3	-1	0	unknown	
2929	cellular	17	nov	148	2	-1	0	unknown	
3145	telephone	6	feb	18	6	-1	0	unknown	
3263	cellular	18	nov	144	1	-1	0	unknown	
3313	cellular	18	may	182	1	-1	0	unknown	
3556	unknown	5	may	357	1	-1	0	unknown	
3704	cellular	4	feb	1086	1	-1	0	unknown	
3733	cellular	30	jul	638	3	-1	0	unknown	
3745	cellular	1	jun	161	2	-1	0	unknown	
3905	cellular	15	jun	92	1	301	6	failure	
3949	unknown	29	may	195	2	-1	0	unknown	
4027	cellular	3	feb	225	4	-1	0	unknown	
4066	cellular	8	oct	113	1	-1	0	unknown	
4102	cellular	16	apr	137	1	-1	0	unknown	
4125	cellular	30	jan	533	1	-1	0	unknown	
4130	unknown	26	may	155	6	-1	0	unknown	
4140	cellular	29	jan	124	1	-1	0	unknown	
4179	cellular	24	jul	229	2	-1	0	unknown	
4181	cellular	18	nov	641	1	-1	0	unknown	
4271	cellular	21	nov	201	1	113	2	failure	
4289	cellular	21	jul	53	6	-1	0	unknown	
4395	cellular	6	may	265	2	342	2	failure	

	deposit
74	no
304	no
404	no
464	no
494	no
550	no
644	no
690	no
705	no
811	no
821	no
827	no
856	no
966	no
967	no
1003	no
1123	no
1236	no
1351	no
1424	no
1633	no
1828	no
1848	no
1850	no
1961	no
2060	no
2184	no
2292	no
2308	no
2364	no
2464	no
2513	no
2603	no
2681	no
2699	no
2754	no
2762	no
2827	no
2913	no
2929	no
3145	no
3263	no
3313	no
3556	no
3704	no
3733	no
3745	no
3905	no
3949	no
4027	no
4066	no
4102	no
4125	no
4130	no
4140	no
4179	no
4181	no
4271	no
4289	no
4395	no

Columns 'age' and 'balance' where age is less than or equal to 30:

	age	balance
17	24	0.0
22	29	544.0
26	29	30.0
27	27	195.0
40	30	743.0
...
4440	24	674.0
4448	27	535.0
4449	26	81.0
4454	30	155.0
4455	30	265.0

[809 rows x 2 columns]