

```
import pandas as pd
import numpy as np
from numpy import random
```

task 1

```
x = random.randint(20, size=(4, 4))
# df = pd.DataFrame(np.random.randint(0, 100, size=(10, 5)), columns=list('ABCDE'))

df = pd.DataFrame(x, columns=["A", "B", "C", "D"], index=["a", "b", "c", "d"])
rows, cols = np.where(np.random.random(df.shape) < 0.2)
df.iloc[rows, cols] = np.nan

print(df)
```

	A	B	C	D
a	NaN	6	19	15
b	3.0	18	5	11
c	NaN	11	11	10
d	19.0	0	14	2

task 2

```
df.rename(columns = {'A':'Random Value 1', 'B':'Random Value 2', 'C':'Random Value 3', 'D':'Random Value 4'}, inplace=True)
print(df)
```

	Random Value 1	Random Value 2	Random Value 3	Random Value 4
a	NaN	6	19	15
b	3.0	18	5	11
c	NaN	11	11	10
d	19.0	0	14	2

task 3

```
df.describe()
```

	Random Value 1	Random Value 2	Random Value 3	Random Value 4
count	2.000000	4.000000	4.00000	4.000000
mean	11.000000	8.750000	12.25000	9.500000
std	11.313708	7.632169	5.85235	5.446712
min	3.000000	0.000000	5.00000	2.000000
25%	7.000000	4.500000	9.50000	8.000000
50%	11.000000	8.500000	12.50000	10.500000
75%	15.000000	12.750000	15.25000	12.000000
max	19.000000	18.000000	19.00000	15.000000

task 4

```
df.isnull().sum().sum()
```

2

```
df.isnull().sum()
```

```
Random Value 1    2
Random Value 2     0
Random Value 3     0
Random Value 4     0
dtype: int64
```

```
df.dtypes
```

```
Random Value 1    float64
Random Value 2     int64
```

```
Random Value 3      int64
Random Value 4      int64
dtype: object
```

task 5

```
result = df.values
print(result)
```

```
[[nan  6. 19. 15.]
 [ 3. 18.  5. 11.]
 [nan 11. 11. 10.]
 [19.  0. 14.  2.]]
```

```
print(df[["Random Value 2", "Random Value 3"]])
```

```
Random Value 2  Random Value 3
a                6             19
b               18              5
c               11             11
d                0             14
```

```
print(df.loc['a':'d'][["Random Value 2"]])
```

```
Random Value 2
a                6
b               18
c               11
d                0
```

```
print(df.loc['a':'d'][["Random Value 3"]])
```

```
Random Value 3
a                19
b                5
c               11
d               14
```