02. Changes in Net Worth

From the following table of transactions between two users, write a query to return the change in net worth for each user, ordered by decreasing net change.

```
!pip install polars
import pandas as pd
import numpy as np
import polars as pl

data = {'Sender'           : [5, 1, 2, 2, 3, 3, 1],
        'Receiver'         : [2, 3, 1, 3, 1, 2, 4],
        'Amount'           : [10, 15, 20, 25, 20, 15, 5],
        'Transaction_Date'  : ['12-FEB-20',
                               '13-FEB-20',
                               '13-FEB-20',
                               '14-FEB-20',
                               '15-FEB-20',
                               '15-FEB-20',
                               '16-FEB-20']
        }

pandas_transactions=pd.DataFrame(data)
polars_transactions=pl.DataFrame(data)
```

```
Requirement already satisfied: polars in /usr/local/lib/python3.11/dist-packages
```

```
print(f'transactions table in Pandas:\n{pandas_transactions}')
```

```
transactions table in Pandas:
   Sender  Receiver  Amount Transaction_Date
0       5         2      10        12-FEB-20
1       1         3      15        13-FEB-20
2       2         1      20        13-FEB-20
3       2         3      25        14-FEB-20
4       3         1      20        15-FEB-20
5       3         2      15        15-FEB-20
6       1         4       5        16-FEB-20
```

```
pandas_df1=(pandas_transactions.melt(id_vars=['Amount']
                                     ,value_vars=['Sender','Receiver']
                                     ,var_name='Type'
                                     ,value_name='User_id'
                                    )
                                    .assign(Amount=lambda x:
                                                   x['Amount']*x['Type'].map({'Sender':-1,'Recei
                                    )
)
print(f'Amounts:\n{pandas_df1}')
```

```
Amounts:
    Amount      Type  User_id
0      -10    Sender        5
1      -15    Sender        1
2      -20    Sender        2
3      -25    Sender        2
4      -20    Sender        3
5      -15    Sender        3
6       -5    Sender        1
7       10  Receiver        2
8       15  Receiver        3
9       20  Receiver        1
10      25  Receiver        3
11      20  Receiver        1
12      15  Receiver        2
13       5  Receiver        4
```

```
pandas_changes=(pandas_transactions.melt(id_vars=['Amount']
                                         ,value_vars=['Sender', 'Receiver']
                                         ,var_name='Type'
                                         ,value_name='User_id'
                                        )
                                   .assign(Amount=lambda x:
                                                  x['Amount']*x['Type'].map({'Sender':-1,'R
                                        )
                                   .groupby('User_id',as_index=False)['Amount']
                                   .sum()
                                   .sort_values(by='Amount'
                                                ,ascending=False
                                        )
)
print(f'net changes using Pandas:')
pandas_changes
```

```
net changes using Pandas:
```

	User_id	Amount
0	1	20
2	3	5
3	4	5
4	5	-10
1	2	-20

```
print(f'transactions table in Polars:\n{polars_transactions}')
```

```
transactions table in Polars:
shape: (7, 4)
┌──────────┬──────────┬──────────┬──────────────────┐
│ Sender ┆ Receiver ┆ Amount ┆ Transaction_Date │
│ ---    ┆ ---      ┆ ---    ┆ ---              │
│ i64    ┆ i64      ┆ i64    ┆ str              │
```

```
┌──────────┬──────────┬──────────┬──────────────────────────┐
│ 5        ┆ 2        ┆ 10       ┆ 12-FEB-20                │
│ 1        ┆ 3        ┆ 15       ┆ 13-FEB-20                │
│ 2        ┆ 1        ┆ 20       ┆ 13-FEB-20                │
│ 2        ┆ 3        ┆ 25       ┆ 14-FEB-20                │
│ 3        ┆ 1        ┆ 20       ┆ 15-FEB-20                │
│ 3        ┆ 2        ┆ 15       ┆ 15-FEB-20                │
│ 1        ┆ 4        ┆ 5        ┆ 16-FEB-20                │
└──────────┴──────────┴──────────┴──────────────────────────┘
```

```
polars_df1=(polars_transactions.unpivot(on=['Sender','Receiver']
                                        ,index='Amount'
                                        ,variable_name='Type'
                                        ,value_name='User_id'
                                    )
                                   .with_columns(pl.when(pl.col('Type')=='Sender')
                                                   .then(pl.col('Amount')*-1)
                                                   .otherwise(pl.col('Amount'))
                                                   .alias('Amount')
                                    )
)
print(f'movement by each user:\n{polars_df1}')
```

```
movement by each user:
shape: (14, 3)
┌──────────┬──────────┬──────────┐
│ Amount   ┆ Type     ┆ User_id  │
│ ---      ┆ ---      ┆ ---      │
│ i64      ┆ str      ┆ i64      │
╞══════════╪══════════╪══════════╡
│ -10      ┆ Sender   ┆ 5        │
│ -15      ┆ Sender   ┆ 1        │
│ -20      ┆ Sender   ┆ 2        │
│ -25      ┆ Sender   ┆ 2        │
│ -20      ┆ Sender   ┆ 3        │
│ …        ┆ …        ┆ …        │
│ 20       ┆ Receiver ┆ 1        │
│ 25       ┆ Receiver ┆ 3        │
│ 20       ┆ Receiver ┆ 1        │
│ 15       ┆ Receiver ┆ 2        │
│ 5        ┆ Receiver ┆ 4        │
└──────────┴──────────┴──────────┘
```

```
polars_changes=(polars_transactions.unpivot(on=['Sender','Receiver']
                                            ,index='Amount'
                                            ,variable_name='Type'
                                            ,value_name='User_id'
                                        )
                                       .with_columns(pl.when(pl.col('Type')=='Sender')
                                                       .then(pl.col('Amount')*-1)
                                                       .otherwise(pl.col('Amount'))
                                                       .alias('Amount')
                                        )
                                       .group_by('User_id')
                                       .agg(pl.col('Amount')
                                              .sum()
```

```
                                    )
                                   .sort(by='Amount'
                                         ,descending=True
                                    )
)
print(f'Net changes using Polars:')
polars_changes
```

```
Net changes using Polars:
```

shape: (5, 2)

User_id	Amount
i64	i64
1	20
4	5
3	5
5	-10
2	-20