```
| accid | txdate              | amount |
|-------|---------------------|--------|
|     1 | 2000-01-01 00:00:00 |   1000 |
|     1 | 2000-01-02 00:00:00 |   2000 |
|     1 | 2000-01-03 00:00:00 |   -500 |
|     1 | 2000-01-04 00:00:00 |   -300 |
|     1 | 2000-01-05 00:00:00 |   4000 |
|     1 | 2000-01-06 00:00:00 |  -2000 |
|     1 | 2000-01-07 00:00:00 |   -200 |
```

Frame

OVER() -- RANGE BETWEEN UNBOUNDED PRECEDING AND UNBOUNDED FOLLOWING

OVER(ORDER BY txdate)
    -- RANGE BETWEEN UNBOUNDED PRECEDING AND CURRENT ROW
    -- ROWS BETWEEN UNBOUNDED PRECEDING AND CURRENT ROW

GROUP BY WITH ROLLUP
GROUPING()
WINDOW FUNCTION
1. AGGEGRATE

2. NON AGGEGRATE
    ROW_NUMBER() OVER()

group function
n input rows -> m output row

window function
n input rows -> n output rows

OVER() -> empty
OVER() -> PARTITION BY
OVER() -> ORDER BY
OVER() -> ROWS|RANGE
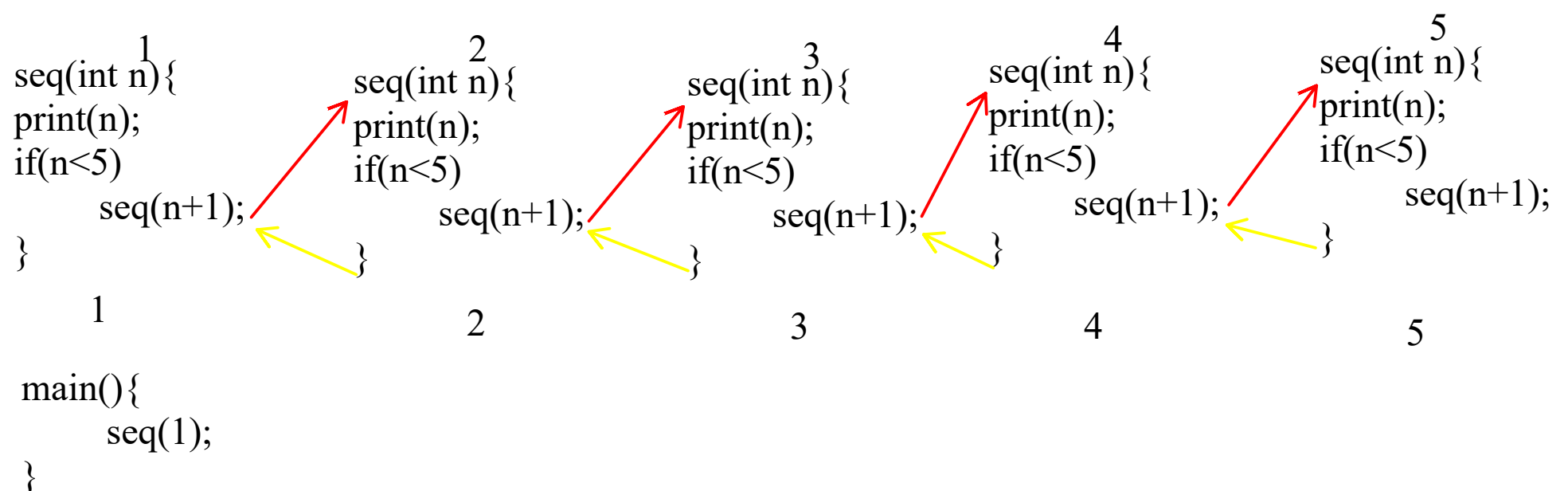
CTE
1. NON RECURSIVE
2. RECURCIVE

```
1                    2                    3                    4                    5
seq(int n){          seq(int n){          seq(int n){          seq(int n){          seq(int n){
print(n);            print(n);            print(n);            print(n);            print(n);
if(n<5)              if(n<5)              if(n<5)              if(n<5)              if(n<5)
    seq(n+1);            seq(n+1);            seq(n+1);            seq(n+1);            seq(n+1);
}                    }                    }                    }                    }
    1                    2                    3                    4                    5

main(){
    seq(1);
}
```
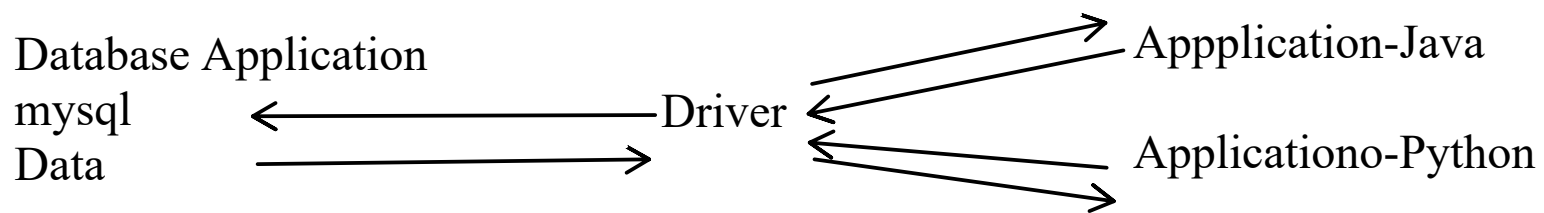
```
WITH RECURSIVE seq(n) AS (
    (SELECT 1)  -- anchor
    UNION
    (SELECT n+1 FROM seq -- recursive member
    WHERE n<5) -- condition
)
SELECT * FROM seq;
```

Database Application   Appplication-Java

mysql   ⟵————————— Driver ⟵

Data   —————————⟶   Applicationo-Python

types of drivers
1. Type-1(JDBC-ODBC BRIDGE DRIVER)
2. Type-2(NATIVE DRIVER)
3. Type-3 (NETWROK DRIVER)
4. Type-4 (DATABASE SPECIFIC DRIVER)

SELECT * FROM customer WHERE email = rohan@gamil.com AND password = 'test' OR 1;