

Customer -> one-to-one -> shipping address

Customer -> one-to-many -> orders

Orders -> many-to-one -> product

Items -> many-to-many -> Category

Customers

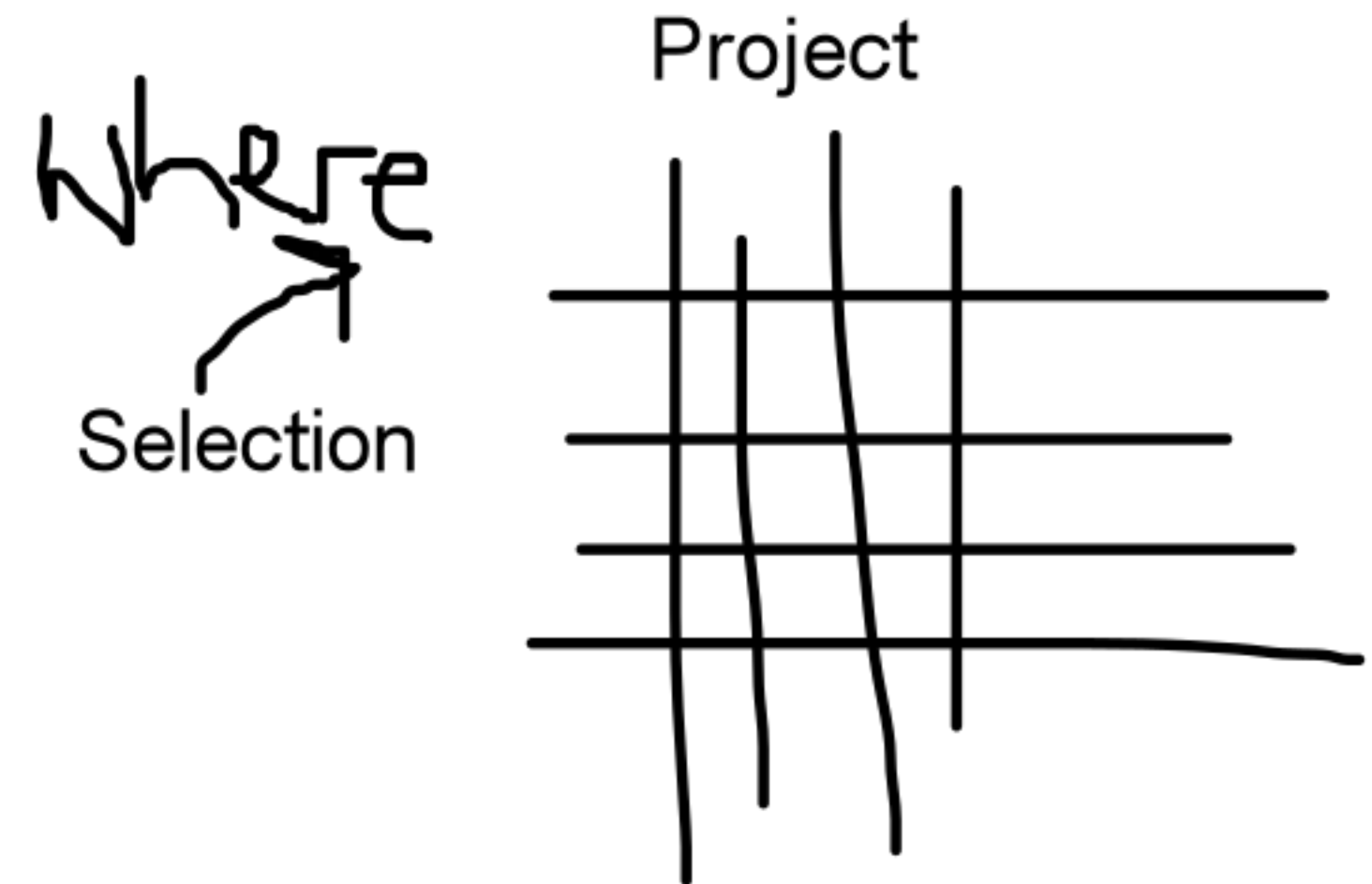
ID	name
0	Sam
1	Andy
2	Sally
3	T
4	Tom
5	Gerry
6	Dick

ORDERS

ID	C_ID	Amount
0	0	10
1	0	15
2	2	20
3	4	20
4	4	30
6	100	50

Many to Many done through join table

ID	Product ID	Cat. ID
0	0	0
1	0	2
3	2	1



SELECT columns
FROM tables
JOIN ON ...
WHERE ...
GROUP BY ...
HAVING ...

```
SELECT c.id as cid, o.id as oid, c.name, sum(c.amount) as sum
FROM customers c,
JOIN orders o on c.id = o.customers_id
WHERE ...
GROUP BY c.id
HAVING sum > 30
```

Normal forms (one-to-one)

1NF: no repeating groups

- separate itemized attributes table w/ id

2NF: removing redundant data

- independent changes " $y \neq f(x)$ "

3NF: eliminate attributes not dependent on key