**Assignment -1**

1.ans

a. What is the schema for this relation (the attributes or columns and their domains or types)?

Ans: customerId(number), Name(varchar), address(varchar), phone number(number)

b. What are possible superkeys for this relation?

Ans: customerId, Name, Address, phone number

c. What are the candidate keys?

Ans: customerId, phone number

d. What is the best choice for primary key?

Ans: customerId

2) ans

Develop the schemas for each of the above relations, including primary keys and foreign keys, using only attributes representing the information described above. Note that for the sales relation, you must develop foreign keys that refer to the member table and the equipment table.

Schema: inventory-> product id(number primary key),manufacturer name(varchar not null) , product model (number), stock(number), retail price(double) whole sale price(double) .

Inventory-> sale id(number not null primary key), product id(number foreign key) ,customer id(number), model number(number), no.of items purchased(number), customer purchased(number), date of sale(Date), total sale(double).

3)

a. Assuming that PID and RNum are unique identifiers, what are likely primary keys for the Penguins and Regions tables?

Ans: Penguins table primary key is PID and regions tables primary key is RNum

b. What is the primary key for the PenguinResidence table?

Ans: PID

c. What are foreign keys necessary for this set of tables in order to ensure that only registered penguins can be in regions of the Antartica and penguins can only reside in registered regions of the Antartic?

Ans: penguin residence table have foreign key that is RNum

d. Can you add a tuple (105, M, Gentoo, 5.7, 69) to the Penguin table? Why or why not?

Ans: No because primary key is find duplicate

e. Can you change the tuple (2, 102) in PenguinResidence to (2, 106)? Why or why not?

Ans: yes, but our schema wise we have a problem that is 106 primary key is not available in our penguins table

4. σD≥g(R2) 6. πD,E(R2)

|  |  |  |  |
| --- | --- | --- | --- |
| D | E | F | G |
| s | 11 | t | f |
| e | 8 | d | b |
| g | 15 | k | t |

5. σD≥g∧(E>12∨D=e)(R2)

|  |  |  |  |
| --- | --- | --- | --- |
| D | E | F | G |
| e | 8 | d | b |
| g | 15 | k | t |

7. πF,G(σD=s(R2))

|  |  |
| --- | --- |
| F | G |
| t | f |

8. R1×R2

|  |
| --- |
| F |
| t |
| t |
| t |
| d |
| d |
| d |
| k |
| k |
| k |

9. σR2.F>R3.F∨R2.G=R3.G(R2×R3)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| D | E | F | G | F | G | H |
| s | 11 | t | f | j | y | i |
| g | 15 | k | t | j | y | i |
| s | 11 | t | f | s | t | f |
| g | 15 | k | t | s | t | f |
| s | 11 | t | f | t | f | s |
| e | 8 | d | b | x | b | o |

10. πF(R2)−πF(R3)

|  |
| --- |
| F |
| d |
| k |

11. πF(R2)∪πF(R3)

|  |
| --- |
| F |
| t |
| d |
| k |
| j |
| s |
| x |

12. πF(R2)∩πF(R3)

|  |
| --- |
| F |
| t |

13.R1 |><| R2

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | B | C | D | D | E | F | G |
| 1 | e | 4 | e | s | 11 | t | f |
| 2 | g | 9 | g | s | 11 | t | f |
| 3 | x | 13 | f | s | 11 | t | f |
| 1 | e | 4 | e | e | 8 | d | b |
| 2 | g | 9 | g | e | 8 | d | b |
| 3 | x | 13 | f | e | 8 | d | b |
| 1 | e | 4 | e | g | 15 | k | t |
| 2 | g | 9 | g | g | 15 | k | t |
| 3 | x | 13 | f | g | 15 | k | t |

15.List of penguin breeds.

Ans : Query: select breed from P;

σ breeds (P)

16.List penguins IDs weighing more than 20 kg.

Ans:

Query: select pid from P where weight>20

σ pid, weight>20 (P)

17.List penguin IDs who are male or under 30 kg in weight using only sigma selection and projection operators.

Ans:

Query: select pid from p where gender=’m’ or weight<30

σ pid, gender=’m’ V weight<30 (P)

18.List the names of female penguin with heights greater than 77 using only sigma selection operator and intersection.

Ans:

Query: select pid from P where gender=’f’ and height>77

σ pid, gender=’f’ ^height>77 (P)

19.List the penguin ID of penguins who live in a region in which the average temperature is -1 C.

Ans:

Query: select pid from PR join R where PR.Rnum= R.RNum and R.temperature=-1;

σ PR.pid, PR.RNum=R.RNum ^ R.Temparature=-1(PR) |><| (R)

20.List the breeds of penguins who live in a region in which the average temperature is -5 C.

Ans:

Query: select breed P join PR on P.pid=PR.pid join R on PR.RNum=R.RNum where R.temperature=-5

σ P.breed (P)P.pid=PR.pid |><| (PR) PR.RNum=R.RNum, R.Temperature=-5 (R)