**Sultanate of Oman**

**Ministry of Higher Education**

**Sohar College of Applied Sciences**

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**Group: 10**

**SFDV3007(Advanced Database Design)**

**Task1**

**(Estimate typical and maximum sizes and growth rate of the tables:)**

* **Maximum table size=maximum record size\*New no. of records**
* **Maximum growth rate= maximum table size\*Current\_no.of\_records**
* **Typical table size=typical record size\*New no.of records**
* **Typical growth rate= typical table size\*Current\_no.of\_record**

**The staff table:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Typical | Maximum | Size | Type | Column |
| )7/2)+1=5 | )7/2)+1=5 | 7 | Number | **Staff\_ID** |
| 40 | 50 | 50 | Char varying | **Surname** |
| 40 | 50 | 50 | Char varying | **Firstname** |
| 9 | 9 | 9 | Char fixed | **Phone** |
| 100 | 150 | 150 | Char varying | **Address** |
| 15 | 18 | 18 | Char varying | **Department** |
| 18 | 20 | 20 | Char varying | **Position** |
| )8/2)+1=5 | (8/2)+1=5 | 8 | Number | **Salary** |
| - | - | 10000 | - | **Current\_no.of\_records** |
| - | - | 0 | - | **New no.of records** |
| Total | | | | |
| 232 | 307 | - | - | **Record size** |
| 232\*10000=2320000 | 307\*10000=3070000 | - | - | **Data volume(byte)** |
| 2.213 | 2.927 | - | - | **Data volume /(1024\*1024)MB** |
| 0 (Because the number of staff which arrive and leave are same(150)) | 0 (Because the number of staff which arrive and leave are same(150)) | - | - | **Growth rate /(1024\*1024)MB** |

**The Customer table:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Typical | Maximum | Size | Type | Column |
| )7/2)+1=5 | )7/2)+1=5 | 7 | Number | **Customer\_ID** |
| 40 | 50 | 50 | Char varying | **Name** |
| 45 | 50 | 50 | Char varying | **Contact\_Person** |
| 9 | 9 | 9 | Char fixed | **Phone** |
| 145 | 150 | 150 | Char varying | **Address** |
| 40 | 50 | 50 | Char varying | **Email** |
| (5/2)+1=4 | (5/2)+1=4 | 5 | Number | **Activity** |
| - | - | 75000 | - | **Current\_no.of\_records** |
| - | - | 3000 | - | **New no.of records** |
| Total | | | | |
| 288 | 318 | - | - | **Record size** |
| 21600000 | 23850000 |  |  | **Data volume(byte)** |
| 20.599 | 22.745 | - | - | **Data volume**  **/(1024/1024)MB** |
| 0.8239 | 0.9098 | - | - | **Growth rate /(1024/1024)MB** |

**The Supplier table:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Typical | Maximum | Size | Type | Column |
| )7/2)+1=5 | )7/2)+1=5 | 7 | Number | **Supplier\_ID** |
| 45 | 50 | 50 | Char varying | **Name** |
| 45 | 50 | 50 | Char varying | **Contact\_Person** |
| 9 | 9 | 9 | Char fixed | **Phone** |
| 140 | 150 | 150 | Char varying | **Address** |
| 40 | 50 | 50 | Char varying | **Email** |
| - | - | 31 | - | **Current\_no.of\_records** |
| - | - | - | - | **New no.of records** |
| Total | | | | |
| 284 | 314 | - | - | **Record size** |
| 8804 | 9734 | - | - | **Data volume(byte)** |
| 8.396\*10^-3 | 9.283\*10^-3 | - | - | **Data volume**  **/(1024\*1024)MB** |
| No growth rate because no changes or updates | No growth rate because no changes or updates | - | - | **Growth rate /(1024\*1024)MB** |

**The Product table:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Typical | Maximum | Size | Type | Column |
| )8/2)+1=5 | )8/2)+1=5 | 8 | Number | **Product\_code** |
| 45 | 50 | 50 | Char varying | **Description** |
| (5/2)+1=4 | (5/2)+1=4 | 5 | Number | **Stack\_count** |
| (5/2)+1=4 | (5/2)+1=4 | 5 | Number | **Restock\_Level** |
| (5/2)+1=4 | (5/2)+1=4 | 5 | Number | **Minimum\_Level** |
| (7/2)+1=5 | (7/2)+1=5 | 7 | Number | **List\_Price** |
| 390\*1024=399360 | 992\*1024=1015808 |  | Blob | **Assembly\_Manual** |
| 7\*1024=7168 | 92\*1024=94208 |  | Blob | **Assembly\_Program** |
| - | - | 7685 | - | **Current\_no.of\_records** |
| - | - | 0 | - | **New no.of records** |
| Total | | | | |
| 406595 | 1110088 | - | - | **Record size** |
| 3124682575 | 8531026280 | - | - | **Data volume(byte)** |
| 2979.92 | 8135.820 | - | - | **Data volume**  **/(1024/1024)MB** |
| No growth rate because no changes or updates | No growth rate because no changes or updates | - | - | **Growth rate /(1024/1024)MB** |

**The Component table:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Typical | Maximum | Size | Type | Column |
| )8/2)+1=5 | )8/2)+1=5 | 8 | Number | **Component\_code** |
| 15 | 20 | 20 | Char varying | **Suppliers\_code** |
| 45 | 50 | 50 | Char varying | **Description** |
| (7/2)+1=5 | (7/2)+1=5 | 7 | Number | **Stack\_count** |
| (7/2)+1=5 | (7/2)+1=5 | 7 | Number | **Supplier\_ID** |
| - | - | 90000 | - | **Current\_no.of\_records** |
| - | - | 0 | - | **New no.of records** |
| Total | | | | |
| 75 | 85 | - | - | **Record size** |
| 6750000 | 7650000 | - | - | **Data volume(byte)** |
| 6.437 | 7.295 | - | - | **Data volume**  **/(1024\*1024)MB** |
| No growth rate because no changes or updates | No growth rate because no changes or updates | - | - | **Growth rate /(1024\*1024)MB** |

**The Assembly table:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Typical | Maximum | Size | Type | Column |
| )8/2)+1=5 | )8/2)+1=5 | 8 | Number | **Product\_code** |
| (8/2)+1=5 | )8/2)+1=5 | 8 | Number | **Component\_code** |
| (4/2)+1=3 | (4/2)+1=3 | 4 | Number | **Quantity** |
| - | - | 2000000 | - | **Current\_no.of\_records** |
| - | - | - | - | **New no.of records** |
| Total | | | | |
| 13 | 13 | - | - | **Record size** |
| 26000000 | 26000000 | - | - | **Data volume(byte)** |
| 24.7955 | 24.7955 | - | - | **Data volume**  **/(1024\*1024)MB** |
| No growth rate because no changes or updates | No growth rate because no changes or updates | - | - | **Growth rate /(1024\*1024)MB** |

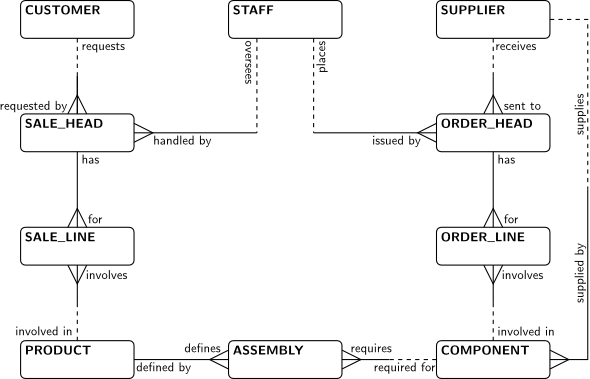
**The Sale\_head table:**

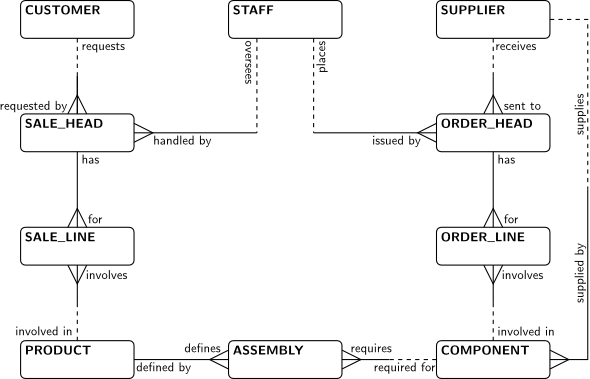
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Typical | Maximum | Size | Type | Column |
| )10/2)+1=6 | )10/2)+1=6 | 10 | Number | **Sale\_num** |
| 15 | 8 | - | Date | **Sale\_date** |
| 1 | 1 | 1 | Char fixed | **Status** |
| (7/2)+1=5 | (7/2)+1=5 | 7 | Number | **Staff\_ID** |
| (7/2)+1=5 | (7/2)+1=5 | 7 | Number | **Customer\_ID** |
| - | - | - | - | **Current\_no.of\_records** |
| - | - | 225000 | - | **New no.of records** |
| Total | | | | |
| 25 | 25 | - | - | **Record size** |
| We don't have no. of records | We don't have no. of records | - | - | **Data volume(byte)** |
| We don't have no. of records | We don't have no. of records | - | - | **Data volume**  **/(1024/1024)MB** |
| 5.3644 | 5.3644 | - | - | **Growth rate /(1024/1024)MB** |

**The Sale\_line table:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Typical | Maximum | Size | Type | Column |
| )8/2)+1=5 | )8/2)+1=5 | 8 | Number | **Product\_code** |
| )10/2)+1=6 | )10/2)+1=6 | 10 | Number | **Sale\_num** |
| )6/2)+1=4 | )6/2)+1=4 | 6 | Number | **Quantity** |
| (7/2)+1=5 | (7/2)+1=5 | 7 | Number | **Actual\_price** |
| - | - | - | - | **Current\_no.of\_records** |
| - | - | 2250000 | - | **New no.of records** |
| Total | | | | |
| 20 | 20 | - | - | **Record size** |
| We don't have no. of records | We don't have no. of records | - | - | **Data volume(byte)** |
| We don't have no. of records | We don't have no. of records | - | - | **Data volume**  **/(1024\*1024)MB** |
| 42.9153 | 42.9153 | - | - | **Growth rate /(1024\*1024)MB** |

**Task 2& Task3:**

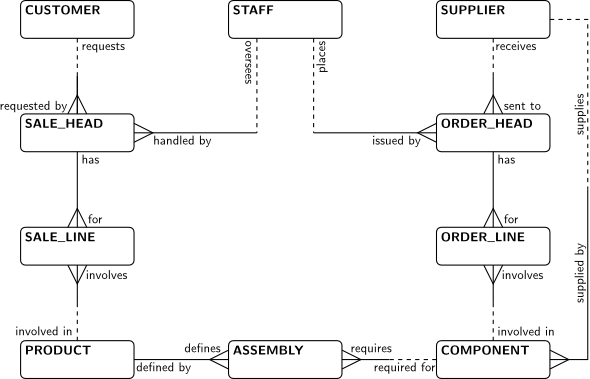




1. **Updatecustomer table:**

* **read the table customer**
* **Then update the phone of customer with ID=2.**

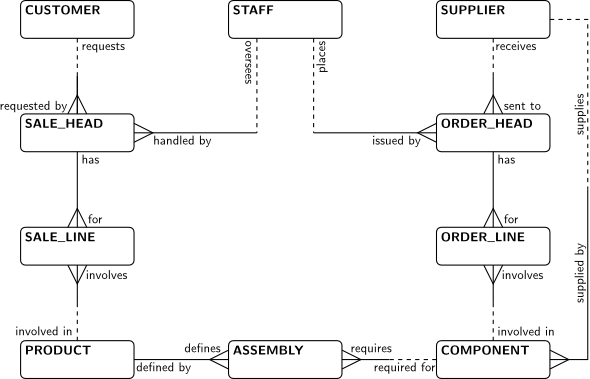
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Step | Name | Type | reference | Peak time | Access path |
| 1 | **Customer** | **R** | **1** | **---** | **Customer** |
| 2 | **customer** | **U** | **1** | **---** | **CustomerCustomer** |

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1. **Insert new Sale\_head : (means create new sale head):**

* **Create new sale head**
* **read thecustomer table to check**
* **read table staff to check**
* **create in sale\_line**
* **read table sale head to validate**
* **read table product**

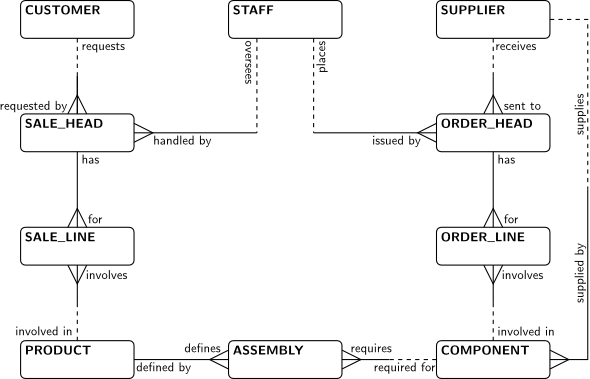
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Step | Name | Type | reference | Peak time | Access path |
| 1 | **Sale\_head** | **C** | **1** | **1350/8=169** | **Sale\_head** |
| 2 | **Customer** | **R** | **1** | **1350/8=169** | **Sale\_head customer** |
| 3 | **Staff** | **R** | **1** | **1350/8=169** | **Sale\_head staff** |
| 4 | **Sale\_line** | **C** | **1** | **13500/8=1688** | **Sale\_Line** |
| 5 | **Sale\_head** | **R** | **10-15** | **13500/8=1688** | **Sale\_LineSale\_head** |
| 6 | **Product** | **R** | **10-15** | **13500/8=1688** | **Sale\_line Product** |
| Total= | | | **24 -34** | **5571** |  |

1. **Insert newProduct :**

* **Create the new record by insert the new Product**
* **Read table assembly to check because there is**

**One to many relationship between product and assembly so primary key in product is foreign key in assembly.**

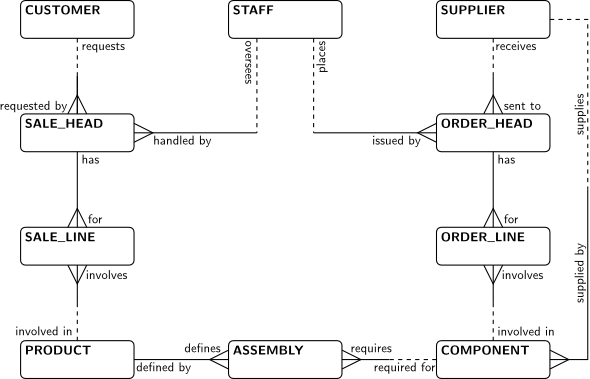
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Step | Name | Type | References | Peak time | Access path |
| 1 | **PRODUCT** | **C** | **1** | **-** | **Product** |
| 2 | **Assembly** | **R** | **1** | **-** | **product Assembly** |
| Total= | | | **2** |  |  |

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1. **Delete component from “Component table” with supplier:**

* **first read the table to check if is exist then**
* **delete records from component**

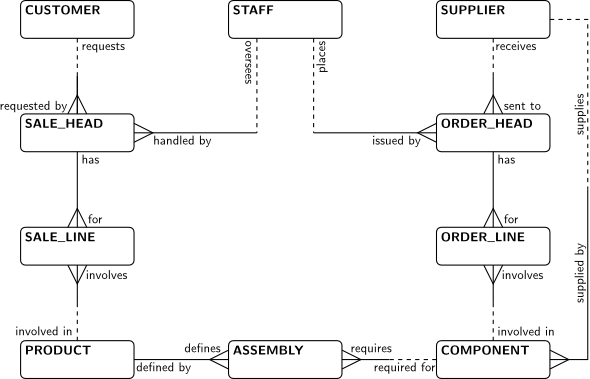
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Step | Name | Type | reference | Peak time | Access path |
| 1 | **Component** | **R** | **90000** | **--** | **Component** |
| 2 | **Component** | **D** | **1** | **--** | **componentcomponent** |
| Total | | | **90001** | **--** |  |

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1. **Insert new staff in Staff table:**

* **Create new record by inseting new staff.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| step | Name | Type | reference | Peak time | Access path |
| 1 | **Staff** | **C** | **1** | **--** | **Staff** |

**6- Update staff table: (update the salary for the staff who work in inventory department)**

* **Read staff table.**
* **Update salary for inventory department (increment the salary by 50%)**
* **(multiply salaryby 50%)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| step | Name | Type | reference | Peak time | Access path |
| 1 | **Staff** | **R** | 10000 | **--** | **Product** |
| 2 | **Staff** | **U** | 1250 | **--** | **product product** |
| Total | | | 11250 |  |  |

**Task 4:**

1. **Rapidly growing tables : Some tables have High Growth rate (sale\_line).so it affect the increase of sale line in the table every year**
2. **Conflicting access path: (complex transaction)some table has many transaction at the same time for example (Assembly table has relation from product table and component table)**
3. **Non indexed access path: some tables have large number of records such as staff table we will take more time to search in 10000 records because more number of records =long time for search.**
4. **None indexed access path for searching in Assembly table which has 2000000 records so it will take long time for reading from this high size of records.**