

Course CS 4513 - 001

Database Management Systems

Fall 2023

Individual Project Title

A Job-Shop Accounting System

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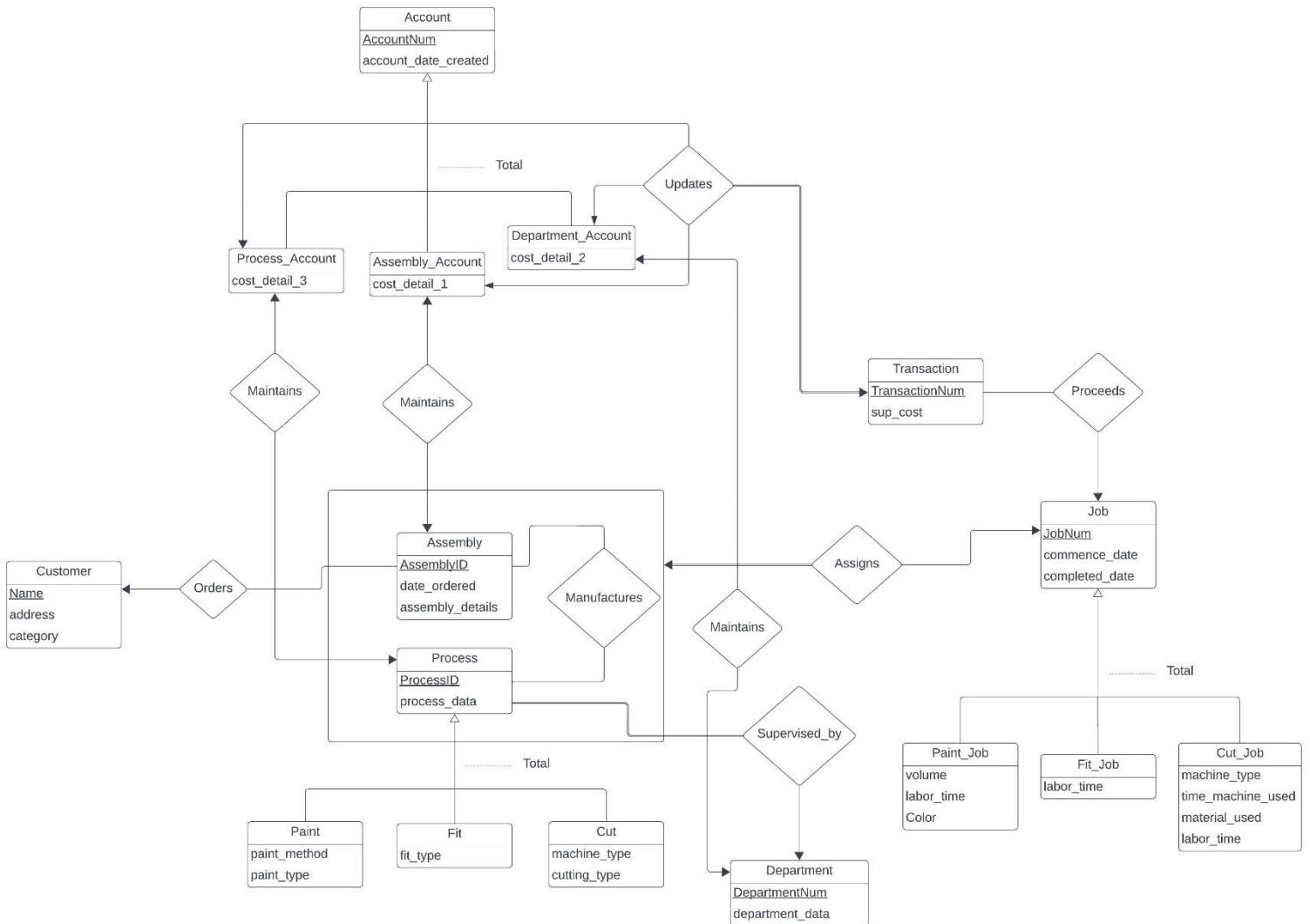
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Task 1: ER Diagram



Task 2: Relational Database Schemas

```
Customer(CustomerName, address, category)
Assemblies(AssemblyID, date_ordered, Assemblies_detail)
Department(DepartmentNum, department_data)
Process(ProcessID, process_data)
Paint_Process(ProcessID, paint_method, paint_type)
Fit_Process(ProcessID, fit_type)
Cut_Process(ProcessID, machine_type, cutting_type)
Job(JobNum, commence_date, completed_date)
Paint_Job(JobNum, volume, color, labor_time)
Fit_Job(JobNum, labor_time)
Cut_Job(JobNum, machine_type_used, time_machine_used, material_used, cut_labor_time)
Transactions(TransactionsNum, sup_cost, AccountNum)
Account(AccountNum, account_date_created)
Process_Account(AccountNum, cost_detail_3)
Assembly_Account(AccountNum, cost_detail_1)
Department_Account(AccountNum, cost_detail_2)
```

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-----Relationship Schema-----

Orders(AssemblyID, Name)

Manufactures(ProcessID, AssemblyID)

Supervised_by(ProcessID, DepartmentNum)

Assigns(AssemblyID, ProcessID, JobNum)

Proceeds(TransactionNum, JobNum)

Maintains_Process(AcountNum, ProcessID)

Maintains_Department(AcountNum, DepartmentNum)

Maintains_Assembly(AcountNum, AssemblyID)

Task 3

3.1. Discussion of storage structures for tables

Table Name	Query # and Type	Search Key	Query Frequency	Selected File Organization	Justification
Customer	[1] Insert. [12] range search	Category	30/day 100/day	B* Tree with index equals to category	A range search is performed 100/day, a B* Tree is appropriate to use
Department	[2] Insert.		Infrequent	Heap file	For insertion purposes in a table, a heap file is appropriate to use
Process	[3] Insert		Infrequent	Heap file	For insertion purposes in a table, a heap file is appropriate to use
Paint_Process	[3] Insert.		Infrequent	Heap file	For insertion purposes in a table, a heap file is appropriate to use
Fit_Process	[3] Insert.		Infrequent	Heap file	For insertion purposes in a table, a heap file is appropriate to use

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Cut_Process	[3] Insert.		Infrequent	Heap file	For insertion purposes in a table, a heap file is appropriate to use
Assembly	[4] Insert.		40/day	Heap file	For insertion
Orders	[4] Insert.		40/day	Heap file	For insertion purposes in a table, a heap file is appropriate to use
Manufactures	[4] Insert. [11] random search	AssemblyID	40/day 100/day	Extendable Hashing with the hash key, "AssemblyID"	For the random search, extendable hashing is appropriate

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					Efficiency
Account	[5] Insert		10/day	Heap	For insertion purposes in a table, a heap file is appropriate to use
Process_Account	[5] Insert. [8] random search	AccountNum	10/day 50/day	Extendable Hashing with the hash key, "ProcessAccountNum"	For the random search, extendable hashing is appropriate
Assembly_Account	[5] Insert. [8] random search [9] random search	AccountNum AccountNum	10/day 50/day 200/day	Extendable Hashing with the hash key, "AssemblyAccountNum"	For the random search, extendable hashing is appropriate
Department_Account	[5] Insert. [8] random search	AccountNum	10/day 50/day	Extendable Hashing with the hash key, "DepartmentNum"	For the random search, extendable hashing is appropriate
Job	[6] Insert		50/day	Heap file	For the random

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	[7] Random search [10] Random Search	JobNum Completed_date	50/day 20/day	Extendable Hashing with hash Key, "JobNum" Extendable Hashing with hash Key, "Completed_date"	search, extendable hashing is appropriate
Paint_Job	[6] Insert. [7] random search [14] random search	JobNum color	50/day 50/day 1/week	Extendable Hashing with the hash key, "PaintJobNum" and "color"	For the random search, extendable hashing is appropriate
Fit_Job	[6] Insert. [7] random search	JobNum	50/day 50/day	Extendable Hashing with the hash key, "JobNum"	For the random search, extendable hashing is appropriate
Cut_Job	[6] Insert. [7] random search [13] range search [13] deletion	JobNum JobNum JobNum	50/day 50/day 1/month 1/month	Extendable Hashing with the hash key, "JobNum"	For the random search, extendable hashing is appropriate
Assigns	[6] Insert. [10] random search	JobNum	50/day 20/day	Heap file	For insertion purposes in a table, a heap file is appropriate to use

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Transaction	[8] Insert.		50/day	Heap file	For insertion purposes in a table, a heap file is appropriate to use
<hr/>					
Maintain_Assembly	[5] insert. [9] random search	AssemblyID	10/day 200/day	Extendable Hashing with the hash key, "AssemblyID"	For the random search, extendable hashing is appropriate
Maintain_Process	[5] Insert.		10/day	Heap file	For insertion purposes in a table, a heap file is appropriate to use

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Maintain_Department	[5] Insert.		10/day	Heap file	For insertion purposes in a table, a heap file is appropriate to use
Supervised_by	[3] <u>Insert</u> [10] random search [11] random search	ProcessID	Infrequent 20/day	Extendable Hashing with the hash key, "ProcessID"	For the random search, extendable hashing is appropriate
Proceeds	[8] insert.		50/day	Heap file	For insertion purposes in a table, a heap file is appropriate to use

3.2. Discussion of storage structures for tables (Azure SQL Database)

3.2

To explain for each table, what kind of storage structures for each relational tables when implementing it in the Azure Data Studio, I have a written a summarize versions for all relational tables which is applicable.

Azure Data Studio automatically indexes primary keys by default. However, when the search key differs from the primary key, a secondary index must be established on that search key.

The syntax to create this secondary index is as follows:

"Create non clustered index [index-name] on [table]([attribute])"

Since Azure Data Studio doesn't accommodate extendable hashing and B* tree, I will utilize indexed sequential files for tables where extendable hashing would typically be applied.

Task 4.

SQL statements and screenshots showing the creation of tables in Azure SQL

Database

1. Customer table

```
27
28  CREATE TABLE Customer (
29      CustomerName VARCHAR(250),
30      Customer_Address VARCHAR(250),
31      category INT NOT NULL CHECK (category BETWEEN 1 AND 10)
32      PRIMARY KEY (CustomerName)
33  );
34
```

Messages

```
6:50:48 AM    Started executing query at Line 1
                Commands completed successfully.
                Total execution time: 00:00:00.071
```

Creating Index on customer category

```
-- 
36
37  create index Customer_Category_Idx on Customer(category)
38
39
```

Messages

```
7:00:09 AM    Started executing query at Line 1
                Commands completed successfully.
                Total execution time: 00:00:00.117
```

2. Assembly table

```
39
40  CREATE TABLE Assemblies (
41      AssemblyID INT,
42      date_ordered DATE,
43      Assemblies_details VARCHAR(250),
44      PRIMARY KEY (AssemblyID),
45  );
46
```

Messages

7:26:26 AM Started executing query at Line 40
Commands completed successfully.
Total execution time: 00:00:00.183

3. Orders table

```
48  CREATE TABLE Orders (
49      AssemblyID INT,
50      CustomerName VARCHAR(250),
51      PRIMARY KEY (AssemblyID),
52      FOREIGN KEY (AssemblyID) REFERENCES Assemblies(AssemblyID),
53      FOREIGN KEY (CustomerName) REFERENCES Customer(CustomerName)
54  );
55
```

Messages

7:28:28 AM Started executing query at Line 20
Commands completed successfully.
Total execution time: 00:00:00.049

4. Department table

```
55  
56  
57  CREATE TABLE Department (  
58      DepartmentNum INT,  
59      department_data VARCHAR(250),  
60      PRIMARY KEY (DepartmentNum),  
61  );  
62  
63
```

Messages

7:28:58 AM Started executing query at Line 57
Commands completed successfully.
Total execution time: 00:00:00.097

5. Process table

```
63  
64  CREATE TABLE Process (  
65      ProcessID INT,  
66      process_data VARCHAR(250),  
67      PRIMARY KEY (ProcessID),  
68  );  
69  
70
```

Messages

7:29:56 AM Started executing query at Line 64
Commands completed successfully.
Total execution time: 00:00:00.067

6. Paint Process table

```
69  
70  
71 CREATE TABLE Paint_Process (  
72     ProcessID INT,  
73     paint_type VARCHAR(250),  
74     painting_method VARCHAR(250),  
75     PRIMARY KEY (ProcessID),  
76     FOREIGN KEY (ProcessID) REFERENCES Process(ProcessID)  
77 );  
78
```

Messages

7:30:50 AM Started executing query at Line 13
Commands completed successfully.
Total execution time: 00:00:00.209

7. Fit Process table

```
79  
80 CREATE TABLE Fit_Process (  
81     ProcessID INT,  
82     fit_type VARCHAR(250),  
83     PRIMARY KEY (ProcessID),  
84     FOREIGN KEY (ProcessID) REFERENCES Process(ProcessID)  
85 );  
86
```

Messages

7:31:28 AM Started executing query at Line 1
Commands completed successfully.
Total execution time: 00:00:00.202

8. Cut Process table.

```
--  
87  
88  CREATE TABLE Cut_Process (  
89      ProcessID INT,  
90      cutting_type VARCHAR(250),  
91      machine_type VARCHAR(250),  
92      PRIMARY KEY (ProcessID),  
93      FOREIGN KEY (ProcessID) REFERENCES Process(ProcessID)  
94  
95  );|  
96  
97
```

Messages

7:36:13 AM Started executing query at Line 88
Commands completed successfully.
Total execution time: 00:00:00.068

9. Supervised_by table.

```
98  CREATE TABLE supervised_by (
99      ProcessID INT,
100     DepartmentNum INT,
101     PRIMARY KEY (ProcessID),
102     FOREIGN KEY (ProcessID) REFERENCES Process(ProcessID),
103     FOREIGN KEY (DepartmentNum) REFERENCES Department(DepartmentNum)
104
105 )
```

Messages

7:37:14 AM Started executing query at Line 1
Commands completed successfully.
Total execution time: 00:00:00.312

```
106
107     create index sup_by_processID_Idx on supervised_by(ProcessID)
108
```

Messages

7:39:10 AM Started executing query at Line 1
Commands completed successfully.
Total execution time: 00:00:00.333

10. Job table

```
108
109  CREATE TABLE Job (
110    JobNum INT,
111    commence_date DATE,
112    completed_date DATE,
113    PRIMARY KEY (JobNum)
114 )
```

Messages

7:40:15 AM Started executing query at Line 23
Commands completed successfully.
Total execution time: 00:00:00.054

```
115 |
116  create index completed_date_indx on Job(completed_date)
117
```

Messages

7:43:18 AM Started executing query at Line 1
Commands completed successfully.
Total execution time: 00:00:00.202

11. Cut Job table.

```
117
118  CREATE TABLE Cut_Job (
119    JobNum INT,
120    machine_type_used VARCHAR(250),
121    time_machine_used DECIMAL(10,2),
122    material_used VARCHAR(250),
123    labor_time DECIMAL(10,2),
124    PRIMARY KEY (JobNum),
125    FOREIGN KEY (JobNum) REFERENCES Job(JobNum),
126
127 );
128
```

Messages

7:45:02 AM Started executing query at Line 1
Commands completed successfully.
Total execution time: 00:00:00.261

12. Paint Job table

```
128  
129  CREATE TABLE Paint_Job (  
130    JobNum INT,  
131    color VARCHAR(250),  
132    volume DECIMAL(10,2),  
133    labor_time DECIMAL(10,2),  
134    PRIMARY KEY (JobNum),  
135    FOREIGN KEY (JobNum) REFERENCES Job(JobNum)  
136  );  
138
```

Messages

7:45:53 AM Started executing query at Line 1
Commands completed successfully.
Total execution time: 00:00:00.314

```
139  
140  create index paint_job_color on Paint_Job(color);  
141
```

Messages

7:47:06 AM Started executing query at Line 1
Commands completed successfully.
Total execution time: 00:00:00.239

13. Fit Job table

```
143  CREATE TABLE Fit_Job (  
144    JobNum INT,  
145    labor_time DECIMAL(10,2) NOT NULL,  
146    PRIMARY KEY (JobNum),  
147    FOREIGN KEY (JobNum) REFERENCES Job(JobNum)  
148  );  
149  
150
```

Messages

7:50:22 AM Started executing query at Line 8
Commands completed successfully.
Total execution time: 00:00:00.054

14. Assigns table.

```
151  CREATE TABLE Assigns (
152      AssemblyID INT,
153      ProcessID INT,
154      JobNum INT,
155      PRIMARY KEY (AssemblyID, ProcessID),
156      FOREIGN KEY (AssemblyID) REFERENCES Assemblies(AssemblyID),
157      FOREIGN KEY (ProcessID) REFERENCES Process(ProcessID),
158      FOREIGN KEY (JobNum) REFERENCES Job(JobNum),
159  );
160
```

Messages

7:51:39 AM Started executing query at Line 6
Commands completed successfully.
Total execution time: 00:00:00.055

15. Manufactures

```
160
161  CREATE TABLE Manufactures (
162      AssemblyID INT,
163      ProcessID INT,
164      PRIMARY KEY (AssemblyID, ProcessID),
165      FOREIGN KEY (AssemblyID) REFERENCES Assemblies(AssemblyID),
166      FOREIGN KEY (ProcessID) REFERENCES Process(ProcessID),
167  );
168
```

Messages

7:52:40 AM Started executing query at Line 24
Commands completed successfully.
Total execution time: 00:00:00.056

```
168
169  create INDEX assemblyIndx on Manufactures(AssemblyID);|
170
```

Messages

7:54:09 AM Started executing query at Line 1
Commands completed successfully.
Total execution time: 00:00:00.260

16. Account

```
171
172 CREATE TABLE Account(
173     AccountNum INT,
174     account_date_created DATE,
175     PRIMARY KEY (AccountNum),
176
177 )
178
```

Messages

7:57:10 AM Started executing query at Line 1
Commands completed successfully.
Total execution time: 00:00:00.303

17. Assembly Account

```
179
180 CREATE TABLE Assembly_Account (
181     AccountNum INT,
182     cost_details_1 DECIMAL(10,2),
183     PRIMARY KEY (AccountNum),
184     FOREIGN KEY (AccountNum) REFERENCES Account(AccountNum)
185 );
186
187
```

Messages

7:58:36 AM Started executing query at Line 19
Commands completed successfully.
Total execution time: 00:00:00.054

18. Department Account

```
187
188  CREATE TABLE Department_Account (
189      AccountNum INT,
190      cost_details_2 DECIMAL(10,2),
191      PRIMARY KEY (AccountNum),
192      FOREIGN KEY (AccountNum) REFERENCES Account(AccountNum)
193
194  );
```

Messages

8:00:34 AM Started executing query at Line 17
Commands completed successfully.
Total execution time: 00:00:00.060

19. Process Account

```
196
197  CREATE TABLE Process_Account (
198      AccountNum INT,
199      cost_details_3 DECIMAL(10,2),
200      PRIMARY KEY (AccountNum),
201      FOREIGN KEY (AccountNum) REFERENCES Account(AccountNum)
202
203  );
```

Messages

8:01:30 AM Started executing query at Line 1
Commands completed successfully.
Total execution time: 00:00:00.327

20. Transactions table

```
204  
205  CREATE TABLE Transactions (  
206      TransactionsNum INT,  
207      AccountNum INT,  
208      sup_cost DECIMAL(10,2),  
209      PRIMARY KEY (TransactionsNum),  
210      FOREIGN KEY (AccountNum) REFERENCES Account(AccountNum)  
211  );
```

Messages

```
8:02:12 AM      Started executing query at Line 5  
                  Commands completed successfully.  
                  Total execution time: 00:00:00.051
```

21. Proceeds table

```
212  
213  CREATE TABLE Proceeds (  
214      TransactionsNum INT,  
215      JobNum INT,  
216      PRIMARY KEY (TransactionsNum),  
217      FOREIGN KEY (TransactionsNum) REFERENCES Transactions(TransactionsNum),  
218      FOREIGN KEY (JobNum) REFERENCES Job(JobNum)  
219  );  
220
```

Messages

```
8:03:16 AM      Started executing query at Line 4  
                  Commands completed successfully.  
                  Total execution time: 00:00:00.055
```

22. Maintains_Process table.

```
220
221  CREATE TABLE Maintains_Process (
222      ProcessID INT,
223      AccountNum INT,
224      PRIMARY KEY (ProcessID),
225      FOREIGN KEY (AccountNum) REFERENCES Account(AccountNum),
226      FOREIGN KEY (ProcessID) REFERENCES Process(ProcessID)
227 );
```

Messages

8:03:58 AM Started executing query at Line 3
Commands completed successfully.
Total execution time: 00:00:00.055

23. Maintains_Assemblies table.

```
228
229  CREATE TABLE Maintains_Assemblies (
230      AssemblyID INT,
231      AccountNum INT,
232      PRIMARY KEY (AssemblyID),
233      FOREIGN KEY (AssemblyID) REFERENCES Assemblies(AssemblyID),
234      FOREIGN KEY (AccountNum) REFERENCES Account(AccountNum),
235
236  );
```

Messages

8:04:48 AM Started executing query at Line 1
Commands completed successfully.
Total execution time: 00:00:00.056

```
237
238  CREATE INDEX Main_Ass_ID_Idx on Maintains_Assemblies(AssemblyID);
```

Messages

8:06:08 AM Started executing query at Line 1
Commands completed successfully.
Total execution time: 00:00:00.368

24. Maintains_Department table.

```
239
240  CREATE TABLE Maintains_Department (
241      DepartmentNum INT,
242      AccountNum INT,
243      PRIMARY KEY (DepartmentNum),
244      FOREIGN KEY (DepartmentNum) REFERENCES Department(DepartmentNum),
245      FOREIGN KEY (AccountNum) REFERENCES Account(AccountNum),
246
247  );
```

Messages

```
8:06:50 AM      Started executing query at Line 2
                  Commands completed successfully.
                  Total execution time: 00:00:00.055
```

Task 5.

5.1

SQL statements (and Transact SQL stored procedures, if any)

Implementing all queries (1-15 and error checking)

1. Enter a new customer.

```
16
17      -- 1. Enter a new customer
18      GO
19
20      CREATE PROCEDURE AddCustomer
21          @CustomerName VARCHAR(20),
22          @Customer_Address VARCHAR(100),
23          @category INT
24      AS
25      BEGIN
26
27          INSERT INTO Customer
28          (
29              [CustomerName], [Customer_Address], [category]
30          )
31          VALUES (@CustomerName, @Customer_Address, @category)
32      END
33
34
```

2. Enter a new department.

```
34
35      -- 2. Enter a new Department
36      GO
37
38      CREATE PROCEDURE AddDepartment
39          @DepartmentNum INT,
40          @department_data VARCHAR(100)
41      AS
42      BEGIN
43          INSERT INTO Department
44          (
45              [DepartmentNum], [department_data]
46          )
47          VALUES (@DepartmentNum, @department_data)
48      END
49
```

3. Enter a new process-id and its department together with its type and information relevant to the type.

```
50  -- 3. Enter a new process-id and its department together with its type and information relevant to the type
51
52 GO
53
54 CREATE PROCEDURE AddProcessViaDepartment
55     @ProcessID INT,
56     @DepartmentNum INT,
57     @process_type VARCHAR(10),
58     @process_data VARCHAR(100),
59     @fit_type VARCHAR(100),
60     @paint_type VARCHAR (100),
61     @painting_method VARCHAR(100),
62     @cutting_type VARCHAR (100),
63     @machine_type VARCHAR (100)
64
65 AS
66 BEGIN
67     -- Insert into Process table
68     INSERT INTO Process
69     ([ProcessID], [process_data])
70     VALUES (@ProcessID, @process_data)
71
72     INSERT INTO supervised_by
73     ([ProcessID], [DepartmentNum])
74     VALUES (@ProcessID, @DepartmentNum)
75
76     -- Conditional inserts based on process type
77     IF @process_type = 'fit'
78     BEGIN
79         INSERT INTO Fit_Process
80         ([ProcessID], [fit_type])
81         VALUES (@ProcessID, @fit_type)
82     END
83     ELSE IF @process_type = 'paint'
84     BEGIN
85         INSERT INTO Paint_Process
86         ([ProcessID], [paint_type], [painting_method])
87         VALUES (@ProcessID, @paint_type, @painting_method)
88     END
89
90     ELSE IF @process_type = 'cut'
91     BEGIN
92         INSERT INTO Cut_Process
93         ([ProcessID], [cutting_type], [machine_type])
94         VALUES (@ProcessID, @cutting_type, @machine_type)
95     END
96
```

4. Enter a new assembly with its customer-name, assembly-details, assembly-id, and date-ordered and associate it with one or more processes.

```
97    -- 4. Enter a new assembly with its customer-name, assembly-details, assembly-id, and date- ordered and associate it with one or more processes
98
99    GO
100
101   CREATE PROCEDURE AddAssembly
102       @AssemblyID INT,
103       @date_ordered VARCHAR(10),
104       @assembly_details VARCHAR(100),
105       @CustomerName VARCHAR(20),
106       @ProcessID INT
107   AS
108   BEGIN
109       INSERT INTO Assemblies
110           ( -- Columns to insert data into
111             [AssemblyID], [date_ordered], [Assemblies_details]
112           )
113           VALUES (@AssemblyID, CAST (@date_ordered as DATE), @assembly_details)
114
115       INSERT INTO Orders
116           ( -- Columns to insert data into
117             [AssemblyID], [CustomerName]
118           )
119           VALUES (@AssemblyID, @CustomerName)
120
121       INSERT INTO Manufacturers
122           ( -- Columns to insert data into
123             [AssemblyID], [ProcessID]
124           )
125           VALUES (@AssemblyID, @ProcessID)
126
127   END
```

5. Create a new account and associate it with the process, assembly, or department to which it is applicable.

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```

128 -- 5. Create a new account and associate it with the process, assembly, or department to which it is applicable (10/day).
129 GO
130
131 CREATE PROCEDURE CreateAccount
132     @AccountNum INT,
133     @AssemblyID INT,
134     @account_date_created VARCHAR (10),
135     @cost_detail_1 VARCHAR (255),
136     @cost_detail_2 VARCHAR (255),
137     @cost_detail_3 VARCHAR (255),
138     @DepartmentNum INT,
139     @ProcessID INT,
140     @account_type VARCHAR(10)
141 AS
142 BEGIN
143     -- First, insert the job into the job entity (assuming the table is named 'Job')
144     INSERT INTO Account ([AccountNum], [account_date_created])
145     VALUES (@AccountNum, CAST(@account_date_created as DATE))
146
147     -- Conditional logic for account type selection and insertion into respective tables
148     IF @account_type = 'assembly'
149     BEGIN
150         INSERT INTO Assembly_Account ([AccountNum], [cost_details_1])
151         VALUES (@AccountNum, @cost_detail_1)
152
153
154         INSERT INTO Maintains_Assemblies ([AssemblyID], [AccountNum])
155         VALUES (@AssemblyID, @AccountNum)
156     END
157
158
159     ELSE IF @account_type = 'department'
160     BEGIN
161         INSERT INTO Department_Account ([AccountNum], [cost_details_2])
162         VALUES (@AccountNum, @cost_detail_2)
163
164         INSERT INTO Maintains_Department ([DepartmentNum], [AccountNum])
165         VALUES (@DepartmentNum, @AccountNum)
166     END
167     ELSE IF @account_type = 'process'
168     BEGIN
169         INSERT INTO Process_Account ([AccountNum], [cost_details_3])
170         VALUES (@AccountNum, @cost_detail_3)
171
172         INSERT INTO Maintains_Process ([ProcessID], [AccountNum])
173         VALUES (@ProcessID, @AccountNum)
174     END
175 END

```

6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced.

```
175 -- 6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced (50/day).
176
177
178 GO
179
180 CREATE PROCEDURE CreateJob
181     @JobNum INT,
182     @commence_date VARCHAR (255),
183     @completed_date VARCHAR (255),
184     @machine_type VARCHAR (255),
185     @time_machine_used VARCHAR (255),
186     @material_used VARCHAR (255),
187     @labor_time VARCHAR (255),
188     @color VARCHAR (255),
189     @volume DECIMAL(10,2),
190     @job_type VARCHAR (255),
191     @AssemblyID INT,
192     @ProcessID INT
193 AS
194 BEGIN
195     -- First, insert the job into the job entity (assuming the table is named 'Job')
196     INSERT INTO Job ([JobNum], [commence_date], [completed_date])
197     VALUES (@JobNum, CAST(@commence_date as DATE), CAST(@completed_date as DATE))
198
199     INSERT INTO Assigns ([AssemblyID],[ProcessID],[JobNum])
200     VALUES (@AssemblyID,@ProcessID,@JobNum)
201
202     -- Conditional logic for account type selection and insertion into respective tables
203     IF @job_type = 'cut'
204     BEGIN
205         INSERT INTO Cut_Job ([JobNum], [machine_type_used], [time_machine_used], [material_used], [labor_time])
206         VALUES (@JobNum, @machine_type, @time_machine_used, @material_used, @labor_time)
207     END
208
209     ELSE IF @job_type = 'fit'
210     BEGIN
211         INSERT INTO Fit_Job ([JobNum], [labor_time])
212         VALUES (@job_type, @labor_time)
213     END
214
215     ELSE IF @job_type = 'paint'
216     BEGIN
217         INSERT INTO Paint_Job ([JobNum], [color], [volume], [labor_time])
218         VALUES (@JobNum, @color, @volume, @labor_time)
219     END
220
221 END
```

7. At the completion of a job, enter the date it was completed and the information relevant to the type of job.

JOB-SHOP ACCOUNTING SYSTEM

```
222 -- 7. At the completion of a job, enter the date it completed and the information relevant to the type of job (50/day).|
223
224
225
226
227 CREATE PROCEDURE proc_update_job_completion
228     @JobNum INT,
229     @completed_date VARCHAR (255),
230     @labor_time VARCHAR (255),
231     @color_ VARCHAR (255),
232     @volume DECIMAL(18,2),
233     @machine_type_used VARCHAR (255),
234     @time_machine_used VARCHAR (255),
235     @material_used VARCHAR (255)
236
237 AS
238 BEGIN
239     -- Update the job completion date in the Job table
240     UPDATE Job
241     SET completed_date = CAST(@completed_date as DATE)
242     WHERE JobNum = @JobNum
243
244     -- Check and update Paint_Job if the job_no exists there
245     IF EXISTS (SELECT 1 FROM Paint_Job WHERE JobNum = @JobNum)
246     BEGIN
247         -- Assuming we update some attribute in Paint_Job, for example, labor_time
248         UPDATE Paint_Job SET labor_time = @labor_time, color = @color, volume = @volume
249         WHERE JobNum = @JobNum
250
251     -- Check and update Fit_Job if the job_no exists there
252     IF EXISTS (SELECT 1 FROM Fit_Job WHERE JobNum = @JobNum)
253     BEGIN
254         -- Assuming we update some attribute in Fit_Job, for example, labor_time
255         UPDATE Fit_Job SET labor_time = @labor_time
256         WHERE JobNum = @JobNum
257
258     -- Check and update Cut_Job if the job_no exists there
259     IF EXISTS (SELECT 1 FROM Cut_Job WHERE JobNum = @JobNum)
260     BEGIN
261         -- Assuming we update some attribute in Cut_Job, for example, cut_labor_time
262         UPDATE Cut_Job SET labor_time = @labor_time, machine_type_used = @machine_type_used, time_machine_used = @time_machine_used, material_used = @material_used
263         WHERE JobNum = @JobNum
264
265     END
266
267 END
268
```

8. Enter transaction no and its sup-cost and update all the costs (details) of the affected accounts by adding sup-cost to their current values of details.

```
267 -- 8. Enter a transaction-no and its sup-cost and update all the costs (details) of the affected accounts by adding sup-cost to their current values of details (50/day)
268
269
270 GO
271
272 CREATE PROCEDURE Proced_8
273     @trans_no INT,
274     @supplementary_cost DECIMAL (10,2),
275     @AccountNum INT
276 AS
277 BEGIN
278     -- Insert into Transactions table
279     INSERT INTO Transactions
280     ([TransactionsNum], [sup_cost], [AccountNum])
281     VALUES (@trans_no, @supplementary_cost, @AccountNum);
282
283     -- Update the corresponding account details based on AccountNum
284     -- Assuming AccountNum uniquely identifies an account across Dept_acc, Assembly_acc, and Process_acc
285
286     IF EXISTS (SELECT 1 FROM Department_Account WHERE AccountNum = @AccountNum)
287     BEGIN
288         UPDATE Department_Account
289             SET cost_details_2 = cost_details_2 + @supplementary_cost
290             WHERE AccountNum = @AccountNum;
291     END
292
293     IF EXISTS (SELECT 1 FROM Assembly_Account WHERE AccountNum = @AccountNum)
294     BEGIN
295         UPDATE Assembly_Account
296             SET cost_details_1 = cost_details_1 + @supplementary_cost
297             WHERE AccountNum = @AccountNum;
298     END
299
300     IF EXISTS (SELECT 1 FROM Process_Account WHERE AccountNum = @AccountNum)
301     BEGIN
302         UPDATE Process_Account
303             SET cost_details_3 = cost_details_3 + @supplementary_cost
304             WHERE AccountNum = @AccountNum;
305     END
306 END
307
```

9. Retrieve the total cost incurred on an assembly-id.

```
307
308     -- 9 Retrieve the total cost incurred on an assembly-id (200/day).
309
310     GO
311
312     CREATE PROCEDURE TotalCostAssemblyID
313         @AssemblyID INT,
314         @TotalCost DECIMAL(10,2) OUTPUT
315     AS
316     BEGIN
317         SELECT @TotalCost = sum(a.cost_details_1)
318         FROM Assembly_Account a JOIN Maintains_Assemblies ma ON a.AccountNum = ma.AccountNum
319         WHERE ma.AssemblyID = @AssemblyID
320     END
321
```

10. Retrieve the total labor time within a department for jobs completed in the department during a given date.

```

322 -- 10 Retrieve the total labor time within a department for jobs completed in the department during a given date (20/day).
323
324 GO
325
326 CREATE PROCEDURE proc_10
327     @dept_no INT,
328     @date_completed DATE,
329     @total_labor_time_in_minutes DECIMAL(10,2) OUTPUT
330
331 AS
332 BEGIN
333
334     -- Calculate total labor time from Paint_Job, Fit_Job, and Cut_Job for the jobs completed on @date_completed in the specified department
335     SELECT @total_labor_time_in_minutes = ISNULL(SUM(labor_time_in_minutes), 0)
336     FROM (
337         SELECT Job.JobNum
338         FROM Job
339         INNER JOIN Assigns ON Job.JobNum = Assigns.JobNum
340         INNER JOIN Supervised_by ON Assigns.ProcessID = Supervised_by.ProcessID
341         WHERE Job.completed_date = @date_completed
342             AND Supervised_by.DepartmentNum = @dept_no
343     ) AS CompletedJobs
344     LEFT JOIN (
345         SELECT JobNum, (DATEPART(HOUR, labor_time) * 60) + DATEPART(MINUTE, labor_time) AS labor_time_in_minutes
346         FROM Paint_Job
347         UNION ALL
348         SELECT JobNum, (DATEPART(HOUR, labor_time) * 60) + DATEPART(MINUTE, labor_time)
349         FROM Fit_Job
350         UNION ALL
351         SELECT JobNum, (DATEPART(HOUR, labor_time) * 60) + DATEPART(MINUTE, labor_time)
352         FROM Cut_Job
353     ) AS JobTimes ON CompletedJobs.JobNum = JobTimes.JobNum;
354
355     -- Return the total labor time in minutes
356     SELECT @total_labor_time_in_minutes AS TotalLaborTimeMinutes;
357 END
358

```

11. Retrieve the processes through which a given assembly-id has passed so far (in date-commenced order) and the department responsible for each process.

```

359
360     -- 11. Retrieve the processes through which a given assembly-id has passed so far (in date-commenced order) and the department responsible for each process (100/day).
361     GO
362
363     CREATE PROCEDURE RetrieveProcess
364         @AssemblyID VARCHAR(10)
365     AS
366     BEGIN
367         SELECT asg.AssemblyID, sb.DepartmentNum
368         FROM supervised_by sb JOIN Assigns asg ON sb.ProcessID = asg.ProcessID JOIN Job j ON asg.JobNum = j.JobNum
369         WHERE asg.AssemblyID = @AssemblyID AND sb.ProcessID = sb.ProcessID
370         ORDER BY j.commence_date
371
372     END
373

```

12. Retrieve the customers (in name order) whose category is in a given range.

```
373
374    -- 12. Retrieve the customers (in name order) whose category is in a given range (100/day).
375    GO
376
377    CREATE PROCEDURE RetrieveCustomer
378        @st_category INT,
379        @ed_category INT
380    AS
381    BEGIN
382        SELECT CustomerName
383        FROM Customer
384        WHERE category BETWEEN @st_category AND @ed_category
385        ORDER BY CustomerName
386
387    END
388
```

13. Delete all cut-jobs whose job-no is in a given range.

```
388
389    -- 13. Delete all cut-jobs whose job-no is in a given range (1/month).
390
391    GO
392
393    CREATE PROCEDURE DeleteCutJobs
394        @st_i INT,
395        @ed_i INT
396    AS
397    BEGIN
398        DELETE
399        FROM Cut_Job
400        WHERE JobNum >= @st_i AND JobNum <= @ed_i
401
402        DELETE
403        FROM Job
404        WHERE JobNum >= @st_i AND JobNum <= @ed_i
405
406    END
407
```

14. Change the color of a given paint job.

```
407  
408      -- 14. Change the color of a given paint job (1/week).  
409      GO  
410  
411      CREATE PROCEDURE ChangePaintJobColor  
412      |    @JobNum INT,  
413      |    @user_color VARCHAR(255)  
414      AS  
415      BEGIN  
416          UPDATE Paint_Job  
417          SET color = @user_color  
418          WHERE JobNum = @JobNum  
419  
420      END  
421  
422
```

5.2 The Java source program and screenshots showing its successful compilation

```

1● import java.time.format.DateTimeFormatter;■
12
13
14 public class ghulam_task_6 {
15●     /*
16     * @author: Ghulam Ali Doulat
17     * @OUID: 113493774
18     * @CourseName: Database Management Systems
19     *
20     */
21
22     */
23
24     final static String HOSTNAME = "dou10000.database.windows.net";
25     final static String DBNAME = "cs-dsa-4513-sql-db";
26     final static String USERNAME = "dou10000";
27     final static String PASSWORD = "Sultanabad123";
28
29
30     // Database Connecting string URL
31     final static String URL = String.format("jdbc:sqlserver://%s:1433;database=%s;user=%s;password=%s;encrypt=true;" +
32         + "trustServerCertificate=false;hostNameInCertificate=%s.database.windows.net;loginTimeout=30;" ,
33         HOSTNAME, DBNAME, USERNAME, PASSWORD);
34
35
36
37     // the below code briefly describes the format of the query procedures
38     final static String queryFormat1 = "EXEC AddCustomer @CustomerName = ?, @Customer_Address = ?, @category = ?;";
39     final static String queryFormat2 = "EXEC AddDepartment @DepartmentNum = ?, @department_data = ?;";
40     final static String queryFormat3 = "EXEC AddProcessViaDepartment @ProcessID = ?, @DepartmentNum = ?, @process_type = ?, " +
41         + "@fit_type=?, @machine_type=?, @cutting_type=?, @painting_method=?, @paint_type=?, @process_data=?;";
42     final static String queryFormat4 = "EXEC AddAssembly @AssemblyID = ?, @date_ordered = ?, @CustomerName = ?, " +
43         + "@assembly_details = ?, @ProcessID = ?;";
44     final static String queryFormat5 = "EXEC CreateAccount @AccountNum = ?, @account_date_created = ?, " +
45         + "@ProcessID=?, @cost_detail_3=?, @cost_detail_1=?, @account_type=?, @DepartmentNum=?, @AssemblyID=?;";
46     final static String queryFormat6 = "EXEC CreateJob @JobNum = ?, @AssemblyID = ?, @ProcessID=?, @commence_date=?, " +
47         + "@job_types=?, @color=?, @volume=?, @machine_type=?, @material_used=?, @time_machine_used=?, " +
48         + "@labor_time=?, @completed_date=?;";
49     final static String queryFormat7 = "EXEC proc_update_job_completion @JobNum = ?, @completed_date=?, @labor_time=?, @color=?, " +
50         + "@volume=?, @machine_type_used=?, @time_machine_used=?, @material_used?;";
51     final static String queryFormat8 = "EXEC Proced_8 @trans_no = ?, @supplementary_cost = ?, @AccountNum=?;";
52     final static String queryFormat9 = "EXEC TotalCostAssemblyID @AssemblyID=?, @TotalCost=?;";
53     final static String queryFormat10 = "EXEC proc_10 @dept_no=?, @date_completed=?, @total_labor_time_in_minutes=? ;";
54     final static String queryFormat11 = "EXEC RetrieveProcess @AssemblyID=?; - - - - - ";
55     final static String queryFormat12 = "EXEC RetrieveCustomer @category=?, @ed_category=?; ";
56     final static String queryFormat13 = "EXEC DeleteCutJobs @st_i=?, @ed_i=?; ";
57     final static String queryFormat14 = "EXEC ChangePaintJobColor @JobNum=?, @user_color=?; ";
58     final static String queryFormat15 = "SELECT * " +
59         + "FROM Performer";-
60     final static String queryFormat16 = "SELECT * FROM Customer WHERE category between ? AND ?; ";
61     final static String QUERY_TEMPLATE_17 = "SELECT * FROM Performer; ";
62
63
64     final static DateTimeFormatter dateTimeFormat = DateTimeFormatter.ofPattern("MM-dd-yyyy");
65
66
67
68     // Printing out the questions to users
69     // thus, we will populate our database
70     final static String PROMPT =
71         "select one of the options below: \n" +
72             "1. Enter a new customer \n" +
73             "2. Enter a new department \n" +
74             "3. Enter a new process-id and its department together with its type and information " +
75             "relevant to the type\n" +
76             "4. Enter a new assembly with its customer-name, assembly-details, assembly-id, \n" +
77             "and dateordered and associate it with one or more processes\n" +
78             "5. Create a new account and associate it with the process, assembly, or department " +
79             "to which it is applicable\n" +
80             "6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced\n" +
81             "7. At the completion of a job, enter the date it completed and the information " +
82             "relevant to the type of job \n" +
83             "8. Enter a transaction-no and its sup-cost and update all the costs (details) of the \n" +
84             "affected accounts by adding sup-cost to their current values of details \n" +
85             "9. Retrieve the total cost incurred on an assembly-id \n" +
86             "10. Retrieve the total labor time within a department for jobs completed in the " +
87             "department during a given date\n" +
88             "11. Retrieve the processes through which a given assembly-id has passed so far \n" +
89             " (in datecommenced order) and the department responsible for each process\n" +
90             "12. Retrieve the customers (in name order) whose category is in a given range\n" +
91             "13. Delete all cut-jobs whose job-no is in a given range\n" +
92             "14. Change the color of a given paint job\n" +
93             "15. Import: enter new customers from a data file until the file is empty \n" +
94             "16. Export: Retrieve the customers (in name order) whose category is in a given \n" +
95             "+ range and output them to a data file instead of screen" +
96             "\n17. Quit\n";
97

```

JOB-SHOP ACCOUNTING SYSTEM

```

97
98    public static void main(String[] args) throws SQLException, IOException {
99        System.out.println("WELCOME TO THE JOB-SHOP ACCOUNTING DATABASE SYSTEM");
100       final Scanner sc = new Scanner(System.in);
101
102       String option = "";
103
104       while (!option.equals("17")) {
105           System.out.println(PROMPT);
106           System.out.println("Enter your option : ");
107           option = sc.next();
108
109           switch (option) {
110               case "1":
111                   System.out.println("What's the customer name?");
112                   final String user_cust_name = sc.nextLine();
113
114                   System.out.println("what's the customer address?");
115                   final String user_cust_address = sc.nextLine();
116
117                   System.out.println("what's the customer category (1-10?)");
118                   final int user_cust_category = sc.nextInt();
119                   System.out.println("Done!");
120
121                   try (final Connection connection = DriverManager.getConnection(URL)) {
122                       try (final PreparedStatement statement = connection.prepareStatement(queryFormat1)) {
123                           statement.setString(1, user_cust_name);
124                           statement.setString(2, user_cust_address);
125                           statement.setInt(3, user_cust_category);
126                           statement.execute();
127                       }
128                   }
129                   break;
130
131               case "2":
132                   System.out.println("What's the department number?");
133                   final int user_dept_num = sc.nextInt();
134
135                   System.out.println("What's the department data?");
136                   final String user_dept_data = sc.nextLine();
137
138                   System.out.println("Done!");
139
140
141               try (final Connection connection = DriverManager.getConnection(URL)) {
142                   try (final PreparedStatement statement = connection.prepareStatement(queryFormat2)) {
143                       statement.setInt(1, user_dept_num);
144                       statement.setString(2, user_dept_data);
145                       statement.execute();
146                   }
147                   break;
148
149               case "3":
150
151                   System.out.println("What's the process id?");
152                   final int user_processID = sc.nextInt();
153
154                   System.out.println("What's the department number?");
155                   final int user_deptNum = sc.nextInt();
156
157                   System.out.println("What's the process_type (Cut, Paint, Fit) case-sensitive (type in small cases?)");
158                   final String user_ProcessType = sc.nextLine();
159
160                   System.out.println("What's the fit_type?");
161                   final String user_fitType = sc.nextLine();
162
163                   System.out.println("What's the machine_type?");
164                   final String user_machineType = sc.nextLine();
165
166                   System.out.println("What's the cutting_type?");
167                   final String user_cuttingType = sc.nextLine();
168
169                   System.out.println("painting method:");
170                   final String user_paintingMethod = sc.nextLine();
171
172                   System.out.println("paint type:");
173                   final String user_paintType = sc.nextLine();
174
175                   System.out.println("process data:");
176                   final String user_processData = sc.nextLine();
177
178                   System.out.println("Done!");
179
180                   try (final Connection connection = DriverManager.getConnection(URL)) {
181                       System.out.println("Dispatching the query...");
182                       try (final PreparedStatement statement = connection.prepareStatement(queryFormat3)) {

```

JOB-SHOP ACCOUNTING SYSTEM

```
183     statement.setInt(1, user_processID);
184     statement.setInt(2, user_deptNum);
185     statement.setString(3, user_ProcessType);
186     statement.setString(4, user_fittType);
187     statement.setString(5, user_machineType);
188     statement.setString(6, user_cuttingType);
189     statement.setString(7, user_paintingMethod);
190     statement.setString(8, user_paintType);
191     statement.setString(9, user_processData);
192     statement.execute();
193   }
194 }
195 break;
196 case "4":
197   System.out.println("What's the assembly id?");
198   final int user_assemblyID = sc.nextInt();
199
200   System.out.println("What's the date ordered param (MM-dd-yyyy)?");
201   final String user_dateOrdered = sc.next();
202
203   System.out.println("What's the customer name?");
204   final String user_customerName = sc.next();
205
206   System.out.println("What's the assembly ordered?");
207   final String user_assemblyDetails = sc.next();
208
209   System.out.println("What's the process id?");
210   final String user_ProcessIDs = sc.next();
211
212   System.out.println("Done!");
213
214 try (final Connection connection = DriverManager.getConnection(URL)) {
215   try (final PreparedStatement statement = connection.prepareStatement(queryFormat4)) {
216     statement.setInt(1, user_assemblyID);
217     statement.setString(2, user_dateOrdered);
218     statement.setString(3, user_customerName);
219     statement.setString(4, user_assemblyDetails);
220     statement.setString(5, user_ProcessIDs);
221     statement.execute();
222   }
223 }
224 break;
225
226
227 case "5":
228   System.out.println("What's the account number?");
229   final int user_AccountNum = sc.nextInt();
230
231   System.out.println("What's the date when account was created?");
232   final String user_AccoutDateCreated = sc.next();
233
234   System.out.println("What's the process id?");
235   final int user_ProcessIDAccount = sc.nextInt();
236
237   System.out.println("What's the cost detail 3?");
238   final float user_cost_details_3 = sc.nextFloat();
239
240   System.out.println("What's the cost detail 2?");
241   final float user_cost_details_2 = sc.nextFloat();
242
243   System.out.println("What's the cost detail 1?");
244   final float user_cost_details_1 = sc.nextFloat();
245
246   System.out.println("What's the account type (Process, Department, Assembly) -- case-sensitive: LOWER CASES --");
247   final String user_accountType = sc.next();
248
249   System.out.println("What's the department number?");
250   final int user_deptNumAccount = sc.nextInt();
251
252   System.out.println("What's the assembly id?");
253   final int user_AssemblyIDAccount = sc.nextInt();
254
255   System.out.println("Done!");
256
257 try (final Connection connection = DriverManager.getConnection(URL)) {
258   try (final PreparedStatement statement = connection.prepareStatement(queryFormat5)) {
259     statement.setInt(1, user_AccountNum);
260     statement.setString(2, user_AccoutDateCreated);
261     statement.setInt(3, user_ProcessIDAccount);
262     statement.setFloat(4, user_cost_details_3);
263     statement.setFloat(5, user_cost_details_2);
264     statement.setFloat(6, user_cost_details_1);
265     statement.setString(7, user_accountType);
266     statement.setInt(8, user_deptNumAccount);
267     statement.setInt(9, user_AssemblyIDAccount);
268     statement.execute();
```

JOB-SHOP ACCOUNTING SYSTEM

```

269         }
270     }
271     break;
272 case "6":
273     System.out.println("What's the job number?");
274     final int user_jobNumQuery6 = sc.nextInt();
275
276     System.out.println("What's the assembly id?");
277     final int user_assemblyIDQuery6 = sc.nextInt();
278
279     System.out.println("What's the process id?");
280     final int user_processIDQuery6 = sc.nextInt();
281
282     System.out.println("What's the commenced date for job?");
283     final String user_jobCommenceDateQuery6 = sc.next();
284
285     System.out.println("What's the job type (Paint, Fit, Cut) -- case-sensitive: LOWER CASES --?");
286     final String user_jobTypeQuery6 = sc.next();
287
288     System.out.println("What's the color for the job?");
289     final String user_colorQuery6 = sc.next();
290
291     System.out.println("What's the volume for the job?");
292     final double user_volumeQuery6 = sc.nextDouble();
293
294     System.out.println("What's the machine type used for the job?");
295     final String user_machineTypeUsedQuery6 = sc.next();
296
297     System.out.println("What's the material used for the job?");
298     final String user_materialUsedQuery6 = sc.next();
299
300     System.out.println("What's the time machine has used for the job?");
301     final String user_timeMachineUsed = sc.next();
302
303     System.out.println("What's the labor time for the job?");
304     final double user_laborTimeQuery6 = sc.nextDouble();
305
306     System.out.println("What's the completed date for the job?");
307     final String user_completedDateQuery6 = sc.next();
308
309     System.out.println("Done!");
310
311     try (final Connection connection = DriverManager.getConnection(URL)) {
312
313         try (final PreparedStatement statement = connection.prepareStatement(queryFormat6)) {
314             statement.setInt(1, user_jobNumQuery6);
315             statement.setInt(2, user_assemblyIDQuery6);
316             statement.setInt(3, user_processIDQuery6);
317             statement.setString(4, user_jobCommenceDateQuery6);
318             statement.setString(5, user_jobTypeQuery6);
319             statement.setString(6, user_colorQuery6);
320             statement.setDouble(7, user_volumeQuery6);
321             statement.setString(8, user_machineTypeUsedQuery6);
322             statement.setString(9, user_materialUsedQuery6);
323             statement.setString(10, user_timeMachineUsed);
324             statement.setDouble(11, user_laborTimeQuery6);
325             statement.setString(12, user_completedDateQuery6);
326             statement.execute();
327         }
328     }
329     break;
330 case "7":
331     System.out.println("what's the job number?");
332     final int user_jobNumQuery7 = sc.nextInt();
333
334     System.out.println("What's the job completed date?");
335     final String user_completedDateQuery7 = sc.next();
336
337     System.out.println("What's the labor time?");
338     final double user_laborTimeQuery7 = sc.nextFloat();
339
340     //color
341     System.out.println("What's the color?");
342     final String user_colorQuery7 = sc.next();
343
344     //volume
345     System.out.println("What's the volume?");
346     final double user_volumeQuery7 = sc.nextDouble();
347
348     //machine type used
349     System.out.println("What's the machine type used?");
350     final String user_machineTypeUsed = sc.next();
351
352     // machine time used
353     System.out.println("What's the machine time used?");
354     final String user_machineTimeUsedQuery7 = sc.next();

```

JOB-SHOP ACCOUNTING SYSTEM

```
355 //material used
356 System.out.println("What's the material used?");
357 final String user_materialUsedQuery7 = sc.next();
358
359
360 System.out.println("Done!");
361
362 try (final Connection connection = DriverManager.getConnection(URL)) {
363     try (final CallableStatement statement = connection.prepareCall(queryFormat7)) {
364         statement.setInt(1, user_jobNumQuery7);
365         statement.setString(2, user_completedDateQuery7);
366         statement.setDouble(3, user_laborTimeQuery7);
367         statement.setString(4, user_colorQuery7);
368         statement.setDouble(5, user_volumeQuery7);
369         statement.setString(6, user_machineTypeUsed);
370         statement.setString(7, user_machineTimeUsedQuery7);
371         statement.setString(8, user_materialUsedQuery7);
372         statement.execute();
373     }
374 }
375 break;
376 case "8":
377
378 System.out.println("What's the transaction number?");
379 final int user_transactionNumQuery8 = sc.nextInt();
380
381 System.out.println("What's the sup cost?");
382 final float user_supCostQuery8 = sc.nextFloat();
383
384 System.out.println("What's the account number for transaction?");
385 final int user_accountNumQuery8 = sc.nextInt();
386
387 System.out.println("Done!");
388
389 try (final Connection connection = DriverManager.getConnection(URL)) {
390     try (final PreparedStatement statement = connection.prepareStatement(queryFormat8)) {
391         statement.setInt(1, user_transactionNumQuery8);
392         statement.setFloat(2, user_supCostQuery8);
393         statement.setInt(3, user_accountNumQuery8);
394         statement.execute();
395     }
396 }
397 break;
398
399 case "9":
400
401 System.out.println("What's the assembly id?");
402 final int user_assemblyIDQuery9 = sc.nextInt();
403
404 System.out.println("Done!");
405
406 try (final Connection connection = DriverManager.getConnection(URL)) {
407     try (final CallableStatement statement = connection.prepareCall(queryFormat9)) {
408
409         statement.setInt(1, user_assemblyIDQuery9);
410         statement.registerOutParameter(2, Types.DECIMAL);
411         // Execute the stored procedure
412         statement.execute();
413
414         // Retrieve the output parameter value
415         BigDecimal totalCost = statement.getBigDecimal(2);
416         System.out.println("Total cost: " + totalCost);
417     }
418 }
419 break;
420 case "10":
421
422 System.out.println("What's the department number?");
423 final int user_departmentNumQuery10 = sc.nextInt();
424
425 System.out.println("What's the job completed date?");
426 final String user_jobCompletedDateQuery10 = sc.next();
427
428 System.out.println("Done!");
429
430 try (final Connection connection = DriverManager.getConnection(URL)) {
431     CallableStatement statement = connection.prepareCall(queryFormat10);
432     // Set the assigned value(s) to the procedures input
433     statement.setInt(1, user_departmentNumQuery10);
434     statement.setString(2, user_jobCompletedDateQuery10);
435     // Run the stored procedure and store values in resultSet
436     statement.registerOutParameter(3, Types.DECIMAL);
437     // Execute the stored procedure
438     statement.execute();
439
440     // Retrieve the output parameter value
441     BigDecimal totalCost = statement.getBigDecimal(3);
```

JOB-SHOP ACCOUNTING SYSTEM

```
442         System.out.println("Total labor time within department " + user_departmentNumQuery10+ " is :" + totalCost);
443     }
444     break;
445 case "11":
446
447     System.out.println("What's the assembly id?");
448     final int user_assemblyIDQuery11 = sc.nextInt();
449
450     System.out.println("Connecting to the database...");
451
452     try (final Connection connection = DriverManager.getConnection(URL)) {
453         // Prepare a call to the stored procedure
454         CallableStatement statement = connection.prepareCall(queryFormat11);
455         // Set the assigned value(s) to the procedures input
456         statement.setInt(1, user_assemblyIDQuery11);
457         // Run the stored procedure and store values in resultSet
458         System.out.println("Outputting the query...");
459         ResultSet resultSet = statement.executeQuery();
460         System.out.println("Done.");
461         System.out.println("\nProcess for assembly id: " + user_assemblyIDQuery11 +
462             ", and its department number; sorted by date commenced.");
463         System.out.println("ProcessID | DepartmentNum");
464         // Unpack the tuples returned by the database and print them out to the user
465         while (resultSet.next()) {
466             System.out.println(String.format("%s | %s",
467                 resultSet.getString(1),
468                 resultSet.getString(1),
469                 resultSet.getString(2)));
470         }
471     }
472     break;
473 case "12":
474
475     System.out.println("What's the starting category (1-10)?");
476     final int user_rangeStartQuery12 = sc.nextInt();
477
478     System.out.println("What's the ending category (1-10)?");
479     final int user_rangeEndQuery12 = sc.nextInt();
480
481     System.out.println("Done!");
482
483     try (final Connection connection = DriverManager.getConnection(URL)) {
484         try (final CallableStatement statement = connection.prepareCall(queryFormat12)) {
485
486             // Set the assigned value(s) to the procedures input
487             statement.setInt(1, user_rangeStartQuery12);
488             statement.setInt(2, user_rangeEndQuery12);
489             // Run the stored procedure and store values in resultSet
490             System.out.println("Outputting the query...");
491             ResultSet resultSet = statement.executeQuery();
492             System.out.println("Done.");
493             System.out.println("\nJobs from starting date " + user_rangeStartQuery12 +
494                 " completed on: " + user_rangeEndQuery12);
495             System.out.println("The customer names are in the selected category range:");
496             // Unpack the tuples returned by the database and print them out to the user
497             while (resultSet.next()) {
498                 System.out.println(String.format("%s",
499                     resultSet.getString(1)));
500             }
501         }
502     }
503     break;
504 case "13":
505
506     System.out.println("What's the starting job number?");
507     final int user_startingJobNumQuery13 = sc.nextInt();
508
509     System.out.println("What's the ending job number?");
510     final int user_endingJobNumQuery13 = sc.nextInt();
511
512     System.out.println("Done!");
513
514     try (final Connection connection = DriverManager.getConnection(URL)) {
515         try (final PreparedStatement statement = connection.prepareStatement(queryFormat13)) {
516             statement.setInt(1, user_startingJobNumQuery13);
517             statement.setInt(2, user_endingJobNumQuery13);
518             statement.executeUpdate();
519         }
520     }
521     break;
522 case "14":
523
524     System.out.println("What's the job number?");
525     final int user_jobNumQuery14 = sc.nextInt();
526
527     System.out.println("What's the color?");
528     final String user_colorQuery14 = sc.next();
529 }
```

JOB-SHOP ACCOUNTING SYSTEM

```
528
529
530
531
532     final String user_colorQuery14 = sc.next();
533
534     System.out.println("Done!");
535
536     try (final Connection connection = DriverManager.getConnection(URL)) {
537         try (final PreparedStatement statement = connection.prepareStatement(queryFormat14)) {
538             statement.setInt(1, user_jobNumQuery14);
539             statement.setString(2, user_colorQuery14);
540             int rows = statement.executeUpdate();
541             System.out.println(rows);
542         }
543     }
544     break;
545
546 case "15":
547     System.out.println("***** Copy the .csv file path you want to read *****");
548
549     String filename = sc.next();
550
551     String query = readCSV(filename);
552
553     try (final Connection connection = DriverManager.getConnection(URL)) {
554         // Prepare a call to the stored procedure
555         PreparedStatement ps = connection.prepareCall(query);
556         System.out.println("Dispatching the query...");
557         // Actually execute the populated query
558         final int rows_inserted = ps.executeUpdate();
559         System.out.println(String.format("Done. %d rows inserted.", rows_inserted));
560     }
561     break;
562
563 case "16":
564     // Prompt for minimum and maximum category numbers
565     System.out.println("Please enter MIN category number (integer from 1 - 10, inclusive):");
566     int min = sc.nextInt();
567
568     System.out.println("Please enter MAX category number (integer from 1 - 10, inclusive):");
569     int max = sc.nextInt();
570
571     // Prompt for file location path
572     System.out.println("Please enter the file location path:");
573     sc.nextLine(); // consume the newline character
574     String filename12 = sc.nextLine();
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614 }
```

JOB-SHOP ACCOUNTING SYSTEM

```
615         sc.close();
616     }
617 }
618
619 // Method to read the csv file
620 public static String readCSV(String filename) throws IOException, SQLException {
621     // StringBuilder to build the insert statement
622     StringBuilder insertStatement = new StringBuilder("INSERT INTO Customer VALUES ");
623
624     // Create input reader
625     try (BufferedReader input = new BufferedReader(new FileReader(filename))) {
626         String line;
627         boolean isFirstLine = true; // flag to check if it's the first line
628
629         // Iterate through each 'row' of the csv
630         while ((line = input.readLine()) != null) {
631             // Add a comma before each line except the first one
632             if (isFirstLine) {
633                 insertStatement.append(", ");
634             } else {
635                 isFirstLine = false;
636             }
637
638             // Split the line into values based on comma
639             String[] values = line.split(",");
640
641             // Ensure there are enough values in the line
642             if (values.length < 3) {
643                 throw new IllegalArgumentException("Not enough values in line: " + line);
644             }
645
646             // Append the values to the insert statement
647             insertStatement.append("(")
648                 .append(values[0].trim()) // assuming the first column is a string
649                 .append(", ")
650                 .append(values[1].trim()) // assuming the second column is a string
651                 .append(", ")
652                 .append(values[2].trim()) // assuming the third column is an integer
653                 .append(")");
654         }
655     }
656 }
657
658 // Return the insert statement
659 return insertStatement.toString();
660 }
661
662
663 }
664
665
666
667
668
```

Successful Compilation Screenshot:

```
ghulam_task_6.java
623     // Create input reader
624     try (BufferedReader input = new BufferedReader(new FileReader(filename))) {
625         String line;
626         boolean isFirstLine = true; // flag to check if it's the first line
627     }
628

Problems Javadoc Declaration Console X
ghulam_task_6 [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (Nov 16, 2023, 9:32:27 PM) [pid: 21532]
WELCOME TO THE JOB-SHOP ACCOUNTING DATABASE SYSTEM

Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen
17. Quit

Enter your option :
```

Task 6. Java program Execution

6.1. Screenshots showing the testing of query 1

```
WELCOME TO THE JOB-SHOP ACCOUNTING DATABASE SYSTEM

Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
   (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
   (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
   range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
1
What's the customer name?
Iqbal
what's the customer address?
Karachi
what's the customer category (1-10?
1
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
1
What's the customer name?
Amin
what's the customer address?
Karachi
what's the customer category (1-10?
1
Done!
```

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
1
What's the customer name?
Ahmed
what's the customer address?
Sindh
what's the customer category (1-10?
2
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
1
What's the customer name?
Mujtaba
what's the customer address?
Gilgit
what's the customer category (1-10?
3
Done!
```

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
1
What's the customer name?
Wahid
what's the customer address?
Kabul
what's the customer category (1-10?
4
Done!
```

Affected Customer Table:

The screenshot shows a SQL Server Management Studio interface. At the top, there are buttons for Run, Cancel, Disconnect, Change, and a dropdown for Database set to 'cs-dsa-4513-sql-db'. Below the database dropdown are checkboxes for Estimated Plan, Enable Actual Plan, Parse, Enable SQLCMD, and To Notebook. The query window contains the following code:

```
1  SELECT *
2  FROM Customer
```

The results grid has columns: CustomerName, Customer_Address, and category. The data is as follows:

	CustomerName	Customer_Address	category
1	Ahmed	Sindh	2
2	Amin	Karachi	1
3	Iqbal	Karachi	1
4	Mujtaba	Gilgit	3
5	Wahid	Kabul	4

Screenshots showing the testing of query 2

Please select one of the options below:

1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id, and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :

2

What's the department number?

1

What's the department data?

Music

[done!]

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
2
What's the department number?
2
What's the department data?
Sport
Done!
```

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
2
What's the department number?
3
What's the department data?
Science
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
   (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
   (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
   range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
2
What's the department number?
4
What's the department data?
Technology
Done!
```

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
   (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
   (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
   range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
2
What's the department number?
5
What's the department data?
Philosophy
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

Affected Department Table

```
▶ Run □ Cancel ⚙ Disconnect ☰ Change | Database: cs-dsa-4513-sql-db ▾ | ⚙ Estimated Plan ⚙ Enable Actual Plan ✓ Parse ⚙ Enable SQLCMD ☒ To Notebook
1  SELECT *
2  FROM Department
```

Results Messages

	DepartmentNum	department_data
1	1	Music
2	2	Sports
3	3	Science
4	4	Technology
5	5	Philosophy

Screenshots showing the testing of query 3

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
3  
What's the process id?  
6  
What's the department number?  
1  
What's the process_type (Cut, Paint, Fit) case-sensitive (type in small cases)?  
fit  
What's the fit type?  
fit01  
What's the machine type?  
MT01  
What's the cutting type?  
CT01  
painting method:  
PM01  
paint type:  
PT01
```

```
process data:  
musical  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

```
Enter your option :
```

```
3
```

```
What's the process id?
```

```
7
```

```
What's the department number?
```

```
1
```

```
What's the process_type (Cut, Paint, Fit) case-sensitive (type in small cases)?
```

```
fit
```

```
What's the fit type?
```

```
fit02
```

```
What's the machine type?
```

```
MT02
```

```
What's the cutting type?
```

```
CT02
```

```
painting method:
```

```
PM02
```

```
paint type:
```

```
PT02
```

```
process data:
```

```
musical
```

```
[done!]
```

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JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
3  
What's the process id?  
8  
What's the department number?  
2  
What's the process_type (Cut, Paint, Fit) case-sensitive (type in small cases)?  
paint  
What's the fit type?  
fit03  
What's the machine type?  
MTU3  
What's the cutting type?  
CTU3  
painting method:  
PMU3  
paint type:  
PTU3
```

```
process data:  
athletic  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
3  
What's the process id?  
9  
What's the department number?  
2  
What's the process_type (Cut, Paint, Fit) case-sensitive (type in small cases)?  
paint  
What's the fit type?  
fit04  
What's the machine type?  
MT04  
What's the cutting type?  
CT04  
painting method:  
PM04
```

```
paint type:  
PT04  
process data:  
athletic  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

```
Enter your option :  
3  
What's the process id?  
10  
What's the department number?  
3  
What's the process_type (Cut, Paint, Fit) case-sensitive (type in small cases)?  
cut  
What's the fit type?  
fit05  
What's the machine type?  
MT05  
What's the cutting type?  
CT05  
painting method:  
PM05
```

```
paint type:  
PT05  
process data:  
experimental  
done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

```
Enter your option :  
3  
What's the process id?  
11  
What's the department number?  
3  
What's the process_type (Cut, Paint, Fit) case-sensitive (type in small cases)?  
cut  
What's the fit type?  
fit06  
What's the machine type?  
MT06  
What's the cutting type?  
CT06  
painting method:  
PM06
```

```
paint type:  
PT06  
process data:  
Experimental  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

```
Enter your option :  
3  
What's the process id?  
12  
What's the department number?  
4  
What's the process_type (Cut, Paint, Fit) case-sensitive (type in small cases)?  
fit  
What's the fit type?  
fit07  
What's the machine type?  
MT07  
What's the cutting type?  
CT07  
painting method:  
PM07
```

```
paint type:  
PT07  
process data:  
Tech  
done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

```
Enter your option :
```

```
3
```

```
What's the process id?
```

```
13
```

```
What's the department number?
```

```
4
```

```
What's the process_type (Cut, Paint, Fit) case-sensitive (type in small cases)?
```

```
fit
```

```
What's the fit type?
```

```
fit08
```

```
What's the machine type?
```

```
MT08
```

```
What's the cutting type?
```

```
CT08
```

```
painting method:
```

```
PM08
```

```
paint type:
```

```
PT08
```

```
process data:
```

```
Tech
```

```
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

Enter your option :

3

What's the process id?

14

What's the department number?

5

What's the process_type (Cut, Paint, Fit) case-sensitive (type in small cases)?

paint

What's the fit type?

fit09

What's the machine type?

MT09

What's the cutting type?

CT09

painting method:

PM09

paint type:

PT09

process data:

Critical

Done!

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
3  
What's the process id?  
15  
What's the department number?  
5  
What's the process_type (Cut, Paint, Fit) case-sensitive (type in small cases)?  
paint  
What's the fit type?  
fit10  
What's the machine type?  
MT10  
What's the cutting type?  
CT10  
painting method:  
PM10
```

```
paint type:  
PT10  
process data:  
Critical  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

```
Enter your option :  
3  
What's the process id?  
16  
What's the department number?  
1  
What's the process_type (Cut, Paint, Fit) case-sensitive (type in small cases)?  
cut  
What's the fit type?  
fit11  
What's the machine type?  
MT11  
What's the cutting type?  
CT11  
painting method:  
PM11
```

```
paint type:  
PT11  
process data:  
musical  
Done!
```

Affected table Process

Run Cancel ⚙ Disconnect ⓘ Change Database: cs-dsa-4513-sql-db Estimated Plan ⚡ Enable Actual Plan ✓ Parse ⚡ Enable SQLCMD ☰ To Notebook

```
1  SELECT *
2  FROM Process
```

Results Messages

	ProcessID	process_data
1	6	musical
2	7	musical
3	8	athletic
4	9	athletic
5	10	experimental
6	11	Experimental
7	12	Tech
8	13	Tech
9	14	Critical
10	15	Critical
11	16	musical

Affected table Fit_Process

Run Cancel ⚙ Disconnect ⓘ Change Database: cs-dsa-4513-sql-db Estimated Plan ⚡ Enable Actual Plan ✓ Parse ⚡ Enable SQLCMD ☰ To Notebook

```
1  SELECT *
2  FROM Fit_Process
```

Results Messages

	ProcessID	fit_type
1	6	fit01
2	7	fit02
3	12	fit07
4	13	fit08

Affected table Paint_Process

JOB-SHOP ACCOUNTING SYSTEM

Run Cancel Disconnect Change Database: cs-dsa-4513-sql-db Estimated Plan Enable Actual Plan Parse Enable SQLCMD To Notebook

```
1 SELECT *
2 FROM Paint_Process
```

Results Messages

	ProcessID	paint_type	painting_method
1	8	PT03	PM03
2	9	PT04	PM04
3	14	PT09	PM09
4	15	PT10	PM10

Affected table Cut_Process

Run Cancel Disconnect Change Database: cs-dsa-4513-sql-db Estimated Plan Enable Actual Plan Parse Enable SQLCMD To Notebook

```
1 SELECT *
2 FROM Cut_Process
```

Results Messages

	ProcessID	cutting_type	machine_type
1	10	CT05	MT05
2	11	CT06	MT06
3	16	CT11	MT11

Screenshots showing the testing of query 4

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
4  
What's the assembly id?  
17  
What's the date ordered param (MM-dd-yyyy)?  
01-01-2000  
What's the customer name?  
Wahid  
What's the assembly ordered?  
MC  
What's the process id?  
6  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
4  
What's the assembly id?  
18  
What's the date ordered param (MM-dd-yyyy)?  
01-02-2000  
What's the customer name?  
Wahid  
What's the assembly ordered?  
NM  
What's the process id?  
6  
Done!
```

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
4  
What's the assembly id?  
19  
What's the date ordered param (MM-dd-yyyy)?  
01-03-2000  
What's the customer name?  
Ahmed  
What's the assembly ordered?  
MC  
What's the process id?  
7  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
4  
What's the assembly id?  
20  
What's the date ordered param (MM-dd-yyyy) ?  
01-04-2000  
What's the customer name?  
Ahmed  
What's the assembly ordered?  
NM  
What's the process id?  
7  
Done!
```

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
4  
What's the assembly id?  
21  
What's the date ordered param (MM-dd-yyyy) ?  
01-05-2000  
What's the customer name?  
Muftaba  
What's the assembly ordered?  
MC  
What's the process id?  
8  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
   (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
   (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
   range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
4
What's the assembly id?
22
What's the date ordered param (MM-dd-yyyy) ?
01-06-2000
What's the customer name?
Mujtaba
What's the assembly ordered?
MC
What's the process id?
8
Done!
```

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
   (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
   (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
   range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
4
What's the assembly id?
23
What's the date ordered param (MM-dd-yyyy) ?
01-07-2000
What's the customer name?
Amin
What's the assembly ordered?
NM
What's the process id?
9
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
4  
What's the assembly id?  
24  
What's the date ordered param (MM-dd-yyyy)?  
01-08-2000  
What's the customer name?  
Amin  
What's the assembly ordered?  
NM  
What's the process id?  
9  
Done!
```

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
4  
What's the assembly id?  
25  
What's the date ordered param (MM-dd-yyyy)?  
01-09-2000  
What's the customer name?  
Iqbal  
What's the assembly ordered?  
MC  
What's the process id?  
10  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
4  
What's the assembly id?  
26  
What's the date ordered param (MM-dd-yyyy)?  
01-10-2000  
What's the customer name?  
Iqbal  
What's the assembly ordered?  
MC  
What's the process id?  
10  
Done!
```

Affected Assemblies table

Run Cancel ⚙ Disconnect ⚙ Change Database: cs-dsa-4513-sql-db Estimated Plan ⚙ Enable Actual Plan ✓ Parse ⚙ Enable SQLCMD ⚙ To Notebook

```
1  SELECT *  
2  FROM Assemblies
```

Results Messages

	AssemblyID	date_ordered	Assemblies_details
1	17	2000-01-01	MC
2	18	2000-01-02	NM
3	19	2000-01-03	MC
4	20	2000-01-04	NM
5	21	2000-01-05	MC
6	22	2000-01-06	MC
7	23	2000-01-07	NM
8	24	2000-01-08	NM
9	25	2000-01-09	MC
10	26	2000-01-10	MC

Affected Orders table

▶ Run □ Cancel ⚙ Disconnect ⚙ Change Database: cs-dsa-4513-sql-db ✓ ⚙ Estimated Plan ⚙ Enable Actual Plan ✓ Parse ⚙ Enable SQLCMD ⚙ To Notebook
1 `SELECT *`
2 `FROM Orders`

Results Messages

	AssemblyID	CustomerName
1	17	Wahid
2	18	Wahid
3	19	Ahmed
4	20	Ahmed
5	21	Mujtaba
6	22	Mujtaba
7	23	Amin
8	24	Amin
9	25	Iqbal
10	26	Iqbal

Screenshots showing the testing of query 5

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
5  
What's the account number?  
27  
What's the date when account was created?  
01-01-2001  
What's the process id:  
6  
What's the cost detail 3?  
10  
What's the cost detail 2?  
15  
What's the cost detail 1:  
100  
What's the account type (Process, Department, Assembly) -- case-sensitive: LOWER CASES --  
process  
What's the department number?  
1
```

```
What's the assembly id?  
17  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

```
Enter your option :
```

```
5
```

```
What's the account number?
```

```
28
```

```
What's the date when account was created?
```

```
01-02-2001
```

```
What's the process id:
```

```
6
```

```
What's the cost detail 3?
```

```
20
```

```
What's the cost detail 2?
```

```
25
```

```
What's the cost detail 1:
```

```
200
```

```
What's the account type (Process, Department, Assembly) -- case-sensitive: LOWER CASES --  
process
```

```
What's the department number?
```

```
2
```

```
What's the assembly id?
```

```
18
```

```
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

Enter your option :

5

What's the account number?

29

What's the date when account was created?

01-03-2001

What's the process id:

7

What's the cost detail 3?

30

What's the cost detail 2?

35

What's the cost detail 1:

300

What's the account type (Process, Department, Assembly) -- case-sensitive: LOWER CASES --
department

What's the department number?

3

What's the assembly id?

19

|done!

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
5  
What's the account number?  
30  
What's the date when account was created?  
01-04-2001  
What's the process id:  
7  
What's the cost detail 3?  
40  
What's the cost detail 2?  
45  
What's the cost detail 1:  
400  
What's the account type (Process, Department, Assembly) -- case-sensitive: LOWER CASES --  
department  
What's the department number?  
4
```

```
What's the assembly id?  
20  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
   and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
   affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
    (in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
    (the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
5  
What's the account number?  
31  
What's the date when account was created?  
01-05-2001  
What's the process id:  
8  
What's the cost detail 3?  
50  
What's the cost detail 2?  
55  
What's the cost detail 1:  
500  
What's the account type (Process, Department, Assembly) -- case-sensitive: LOWER CASES --  
assembly
```

```
What's the department number?  
5  
What's the assembly id?  
5  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
< Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

Enter your option :

5

What's the account number?

32

What's the date when account was created?

01-06-2001

What's the process id:

8

What's the cost detail 3?

60

What's the cost detail 2?

65

What's the cost detail 1:

600

What's the account type (Process, Department, Assembly) -- case-sensitive: LOWER CASES --
assembly

What's the department number?

5

What's the assembly id?

22

Done!

JOB-SHOP ACCOUNTING SYSTEM

```
(e Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

Enter your option :

5

What's the account number?

33

What's the date when account was created?

01-07-2001

What's the process id:

9

What's the cost detail 3?

70

What's the cost detail 2?

75

What's the cost detail 1:

700

What's the account type (Process, Department, Assembly) -- case-sensitive: LOWER CASES --

process

What's the department number?

4

What's the assembly id?

23

Done!

JOB-SHOP ACCOUNTING SYSTEM

```
< Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
5
What's the account number?
34
What's the date when account was created?
01-08-2001
What's the process id:
9
What's the cost detail 3?
80
What's the cost detail 2?
85
What's the cost detail 1:
800
What's the account type (Process, Department, Assembly) -- case-sensitive: LOWER CASES --
process
What's the department number?
3
```

```
What's the assembly id?
24
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

Enter your option :

5

What's the account number?

35

What's the date when account was created?

01-09-2001

What's the process id:

10

What's the cost detail 3?

90

What's the cost detail 2?

95

What's the cost detail 1:

900

What's the account type (Process, Department, Assembly) -- case-sensitive: LOWER CASES --
department

What's the department number?

2

What's the assembly id?

25

Done!

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
5  
What's the account number?  
36  
What's the date when account was created?  
01-10-2001  
What's the process id:  
10  
What's the cost detail 3?  
100  
What's the cost detail 2?  
105  
What's the cost detail 1:  
1000  
What's the account type (Process, Department, Assembly) -- case-sensitive: LOWER CASES --  
assembly  
What's the department number?  
1
```

```
1  
What's the assembly id?  
26  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

Affected Account table

Run Cancel Disconnect Change Database: cs-dsa-4513-sql-db Estimated Plan Enable Actual Plan Parse Enable SQLCMD To Notebook

```
1 SELECT *
2 FROM Account
```

Results Messages

	AccountNum	account_date_created
1	27	2001-01-01
2	28	2001-01-02
3	29	2001-01-03
4	30	2001-01-04
5	31	2001-01-05
6	32	2001-01-06
7	33	2001-01-07
8	34	2001-01-08
9	35	2001-01-09
10	36	2001-01-10

Affected Types of Account

Run Cancel Disconnect Change Database: cs-dsa-4513-sql-db Estimated Plan Enable Actual Plan Parse Enable SQLCMD To Notebook

```
1 SELECT *
2 FROM Assembly_Account
```

Results Messages

	AccountNum	cost_details_1
1	31	500.00
2	32	600.00
3	36	1000.00

JOB-SHOP ACCOUNTING SYSTEM

Run Cancel Disconnect Change Database: cs-dsa-4513-sql-db Estimated Plan Enable Actual Plan Parse Enable SQLCMD To Notebook

```
1  SELECT *
2  FROM Department_Account
```

Results Messages

	AccountNum	cost_details_2
1	29	35.00
2	30	45.00
3	35	95.00

Run Cancel Disconnect Change Database: cs-dsa-4513-sql-db Estimated Plan Enable Actual Plan Parse Enable SQLCMD To Notebook

```
1  SELECT *
2  FROM Process_Account
```

Results Messages

	AccountNum	cost_details_3
1	27	10.00
2	28	20.00
3	33	70.00
4	34	80.00

Screenshots showing the testing of query 6

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
6  
What's the job number?  
37  
What's the assembly id?  
17  
What's the process id?  
6  
What's the commenced date for job?  
01-01-2002  
What's the job type (Paint, Fit, Cut) -- case-sensitive: LOWER CASES --?  
paint  
What's the color for the job?  
blue  
What's the volume for the job?  
1.2  
What's the machine type used for the job?  
x
```

```
What's the material used for the job?  
a  
What's the time machine has used for the job?  
2.2  
What's the labor time for the job?  
3.2  
What's the completed date for the job?  
02-01-2002  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

```
Enter your option :  
6  
What's the job number?  
38  
What's the assembly id?  
17  
What's the process id?  
6  
What's the commenced date for job?  
01-02-2002  
What's the job type (Paint, Fit, Cut) -- case-sensitive: LOWER CASES --?  
paint  
What's the color for the job?  
red  
What's the volume for the job?  
1.3
```

```
What's the machine type used for the job?  
y  
What's the material used for the job?  
b  
What's the time machine has used for the job?  
2.3  
What's the labor time for the job?  
3.3  
What's the completed date for the job?  
02-01-2002  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

```
Enter your option :
```

```
6
```

```
What's the job number?
```

```
39
```

```
What's the assembly id?
```

```
18
```

```
What's the process id?
```

```
7
```

```
What's the commenced date for job?
```

```
01-03-2002
```

```
What's the job type (Paint, Fit, Cut) -- case-sensitive: LOWER CASES --?
```

```
fit
```

```
What's the color for the job?
```

```
green
```

```
What's the volume for the job?
```

```
1.4
```

```
What's the machine type used for the job?
```

```
x
```

```
What's the material used for the job?
```

```
a
```

```
What's the time machine has used for the job?
```

```
2.4
```

```
What's the labor time for the job?
```

```
3.4
```

```
What's the completed date for the job?
```

```
02-03-2002
```

```
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
6  
What's the job number?  
40  
What's the assembly id?  
18  
What's the process id?  
7  
What's the commenced date for job?  
01-04-2002  
What's the job type (Paint, Fit, Cut) -- case-sensitive: LOWER CASES --?  
fit  
What's the color for the job?  
blue  
What's the volume for the job?  
1.5
```

```
--  
What's the machine type used for the job?  
y  
What's the material used for the job?  
b  
What's the time machine has used for the job?  
2.5  
What's the labor time for the job?  
3.5  
What's the completed date for the job?  
02-04-2002  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

```
Enter your option :  
6  
What's the job number?  
41  
What's the assembly id?  
19  
What's the process id?  
8  
What's the commenced date for job?  
01-05-2002  
What's the job type (Paint, Fit, Cut) -- case-sensitive: LOWER CASES --?  
cut  
What's the color for the job?  
yellow  
What's the volume for the job?  
3.4  
What's the machine type used for the job?  
f
```

```
What's the material used for the job?  
d  
What's the time machine has used for the job?  
4.3  
What's the labor time for the job?  
9.3  
What's the completed date for the job?  
02-02-2002  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

Enter your option :

6

What's the job number?

42

What's the assembly id?

19

What's the process id?

8

What's the commenced date for job?

01-07-2002

What's the job type (Paint, Fit, Cut) -- case-sensitive: LOWER CASES --?

fit

What's the color for the job?

orange

What's the volume for the job?

7.3

What's the machine type used for the job?

u

What's the material used for the job?

d

What's the time machine has used for the job?

2.3

What's the labor time for the job?

3.3

What's the completed date for the job?

03-03-2002

Done!

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
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12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

```
Enter your option :
```

```
6
```

```
What's the job number?
```

```
43
```

```
What's the assembly id?
```

```
20
```

```
What's the process id?
```

```
9
```

```
What's the commenced date for job?
```

```
03-09-2002
```

```
What's the job type (Paint, Fit, Cut) -- case-sensitive: LOWER CASES --?
```

```
cut
```

```
What's the color for the job?
```

```
black
```

```
What's the volume for the job?
```

```
8.5
```

```
What's the machine type used for the job?
```

```
c
```

```
What's the material used for the job?
```

```
s
```

```
What's the time machine has used for the job?
```

```
9.4
```

```
What's the labor time for the job?
```

```
9.3
```

```
What's the completed date for the job?
```

```
01-31-2002
```

```
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
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13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
6  
What's the job number?  
44  
What's the assembly id?  
20  
What's the process id?  
9  
What's the commenced date for job?  
01-08-2002  
What's the job type (Paint, Fit, Cut) -- case-sensitive: LOWER CASES --?  
paint  
What's the color for the job?  
yellow  
What's the volume for the job?  
3.2  
What's the machine type used for the job?  
f
```

```
What's the material used for the job?  
c  
What's the time machine has used for the job?  
9.0  
What's the labor time for the job?  
9.77  
What's the completed date for the job?  
08-09-2002  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
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(in datecommenced order) and the department responsible for each process  
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13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
6  
What's the job number?  
45  
What's the assembly id?  
21  
What's the process id?  
10  
What's the commenced date for job?  
01-09-2002  
What's the job type (Paint, Fit, Cut) -- case-sensitive: LOWER CASES --?  
fit  
What's the color for the job?  
green  
What's the volume for the job?  
7.5  
What's the machine type used for the job?  
h
```

```
What's the material used for the job?  
u  
What's the time machine has used for the job?  
9.8  
What's the labor time for the job?  
8.8  
What's the completed date for the job?  
09-08-2002  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
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14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
6  
What's the job number?  
46  
What's the assembly id?  
21  
What's the process id?  
10  
What's the commenced date for job?  
09-01-2002  
What's the job type (Paint, Fit, Cut) -- case-sensitive: LOWER CASES --?  
cut  
What's the color for the job?  
orange  
What's the volume for the job?  
9.3  
What's the machine type used for the job?  
d
```

```
What's the material used for the job?  
t  
What's the time machine has used for the job?  
9.0  
What's the labor time for the job?  
8.8  
What's the completed date for the job?  
09-03-2002  
[done!]
```

JOB-SHOP ACCOUNTING SYSTEM

Affected tables:

▶ Run □ Cancel ⚙ Disconnect ⚙ Change Database: cs-dsa-4513-sql-db Estimated Plan Enable Actual Plan ✓ Parse Enable SQLCMD □ To Notebook

```
1  SELECT *
2  FROM Job
```

Results Messages

	JobNum	commence_date	completed_date
1	37	2002-01-01	2002-02-01
2	38	2002-01-02	2001-02-01
3	39	2002-01-03	2002-02-03
4	40	2002-01-04	2002-02-04
5	41	2002-01-05	2002-02-02
6	42	2002-01-07	2002-03-03
7	43	2002-03-09	2002-01-31
8	44	2022-01-08	2002-08-09
9	45	2002-01-09	2002-09-08
10	46	2002-09-01	2002-09-03

▶ Run □ Cancel ⚙ Disconnect ⚙ Change Database: cs-dsa-4513-sql-db Estimated Plan Enable Actual Plan ✓ Parse Enable SQLCMD □ To Notebook

```
1  SELECT *
2  FROM Cut_Job
```

Results Messages

	JobNum	machine_type_used	time_machine_used	material_used	labor_time
1	41	f	4.30	d	9.30
2	43	c	9.40	s	9.30
3	46	d	9.00	t	8.80

▶ Run □ Cancel ⚙ Disconnect ⚙ Change Database: cs-dsa-4513-sql-db Estimated Plan Enable Actual Plan ✓ Parse Enable SQLCMD □ To Notebook

```
1  SELECT *
2  FROM Paint_Job
```

Results Messages

	JobNum	color	volume	labor_time
1	37	blue	1.20	3.20
2	38	red	1.30	3.30
3	44	yellow	3.20	9.77

JOB-SHOP ACCOUNTING SYSTEM

```
▶ Run □ Cancel ⚙ Disconnect ⚙ Change | Database: cs-dsa-4513-sql-db ▾ | ⚙ Estimated Plan ⚙ Enable Actual Plan ✓ Parse ⚙ Enable SQLCMD □ To Notebook  
1  SELECT *  
2  FROM Fit_Job
```

Results Messages

	JobNum	labor_time
1	39	3.40
2	40	3.50
3	42	3.30
4	45	8.80

```
▶ Run □ Cancel ⚙ Disconnect ⚙ Change | Database: cs-dsa-4513-sql-db ▾ | ⚙ Estimated Plan ⚙ Enable Actual Plan ✓ Parse ⚙ Enable SQLCMD □ To Notebook  
1  SELECT *  
2  FROM Assigns
```

Results Messages

	AssemblyID	ProcessID	JobNum
1	17	6	37
2	18	7	39
3	19	8	41
4	20	9	43
5	21	10	45

Screenshots showing the testing of query 7

```
WELCOME TO THE JOB-SHOP ACCOUNTING DATABASE SYSTEM

Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
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9. Retrieve the total cost incurred on an assembly-id
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    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
7
What's the job number?
46
What's the job completed date?
01-31-2023
What's the labor time?
7.98
What's the color?
Magenta
What's the volume?
3.32
What's the machine type used?
Pulley
What's the machine time used?
34.33
```

```
What's the material used?
Wood
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
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9. Retrieve the total cost incurred on an assembly-id
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11. Retrieve the processes through which a given assembly-id has passed so far
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14. Change the color of a given paint job
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    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
7
What's the job number?
45
What's the job completed date?
01-30-2023
What's the labor time?
8.44
What's the color?
Pink
What's the volume?
64.33
What's the machine type used?
Gear
What's the machine time used?
34.2
What's the material used?
Alloy
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below.
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
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    (in datecommenced order) and the department responsible for each process
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13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
7
What's the job number?
44
What's the job completed date?
01-29-2023
What's the labor time?
6.53
What's the color?
lime
What's the volume?
4.32
What's the machine type used?
wedge
What's the machine time used?
45.32
What's the material used?
plastic
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
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13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
   (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
   range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
7
What's the job number?
43
What's the job completed date?
01-28-2023
What's the labor time?
78.3
What's the color?
Red
What's the volume?
34.22
What's the machine type used?
axle
What's the machine time used?
40.43
What's the material used?
textile
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
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14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

```
Enter your option :
```

```
7
```

```
What's the job number?
```

```
42
```

```
What's the job completed date?
```

```
01-27-2023
```

```
What's the labor time?
```

```
20.41
```

```
What's the color?
```

```
Green
```

```
What's the volume?
```

```
20.51
```

```
What's the machine type used?
```

```
inclined
```

```
What's the machine time used?
```

```
20.51
```

```
What's the material used?
```

```
Alloy
```

```
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
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14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
7
What's the job number?
41
What's the job completed date?
01-26-2023
What's the labor time?
25.54
What's the color?
Black
What's the volume?
22.32
What's the machine type used?
Inclined
What's the machine time used?
40.55
What's the material used?
Metal
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
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affected accounts by adding sup-cost to their current values of details  
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14. Change the color of a given paint job  
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(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

Enter your option :

7

What's the job number?

40

What's the job completed date?

01-25-2023

What's the labor time?

60.00

What's the color?

White

What's the volume?

35.00

What's the machine type used?

Pulley

What's the machine time used?

45.00

What's the material used?

Metal

Done!

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
7  
What's the job number?  
39  
What's the job completed date?  
01-24-2023  
What's the labor time?  
45.00  
What's the color?  
Orange  
What's the volume?  
44.45  
What's the machine type used?  
Gear  
What's the machine time used?  
30.00  
What's the material used?  
Alloy  
[done!]
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
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affected accounts by adding sup-cost to their current values of details  
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10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
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(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

```
Enter your option :
```

```
7
```

```
What's the job number?
```

```
38
```

```
What's the job completed date?
```

```
01-23-2023
```

```
What's the labor time?
```

```
35.00
```

```
What's the color?
```

```
Purple
```

```
What's the volume?
```

```
20.25
```

```
What's the machine type used?
```

```
Inclined
```

```
What's the machine time used?
```

```
15.45
```

```
What's the material used?
```

```
Metal
```

```
Bone!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
7
What's the job number?
37
What's the job completed date?
01-23-2023
What's the labor time?
10.50
What's the color?
Blue
What's the volume?
5.25
What's the machine type used?
Pulley
What's the machine time used?
7.50
What's the material used?
Plastic
bone!
```

Affected Tables:

JOB-SHOP ACCOUNTING SYSTEM

▶ Run □ Cancel ⚙ Disconnect ⚙ Change Database: cs-dsa-4513-sql-db ▾ Estimated Plan Enable Actual Plan Parse Enable SQLCMD To Notebook

```
1  SELECT *
2  FROM Job
```

Results Messages

	JobNum	commence_date	completed_date
1	37	2002-01-01	2023-01-23
2	38	2002-01-02	2023-01-23
3	39	2002-01-03	2023-01-24
4	40	2002-01-04	2023-01-25
5	41	2002-01-05	2023-01-26
6	42	2002-01-07	2023-01-27
7	43	2002-03-09	2023-01-28
8	44	2022-01-08	2023-01-29
9	45	2002-01-09	2023-01-30
10	46	2002-09-01	2023-01-31

▶ Run □ Cancel ⚙ Disconnect ⚙ Change Database: cs-dsa-4513-sql-db ▾ Estimated Plan Enable Actual Plan Parse Enable SQLCMD To Notebook

```
1  SELECT *
2  FROM Paint_Job
```

Results Messages

	JobNum	color	volume	labor_time
1	37	Blue	5.25	10.50
2	38	Purple	20.25	35.00
3	44	lime	4.32	6.53

JOB-SHOP ACCOUNTING SYSTEM

Run Cancel Disconnect Change Database: cs-dsa-4513-sql-db Estimated Plan Enable Actual Plan Parse Enable SQLCMD To Notebook

```
1 SELECT *
2 FROM Fit_Job
```

Results Messages

	JobNum	labor_time
1	39	45.00
2	40	60.00
3	42	20.41
4	45	8.44

Run Cancel Disconnect Change Database: cs-dsa-4513-sql-db Estimated Plan Enable Actual Plan Parse Enable SQLCMD To Notebook

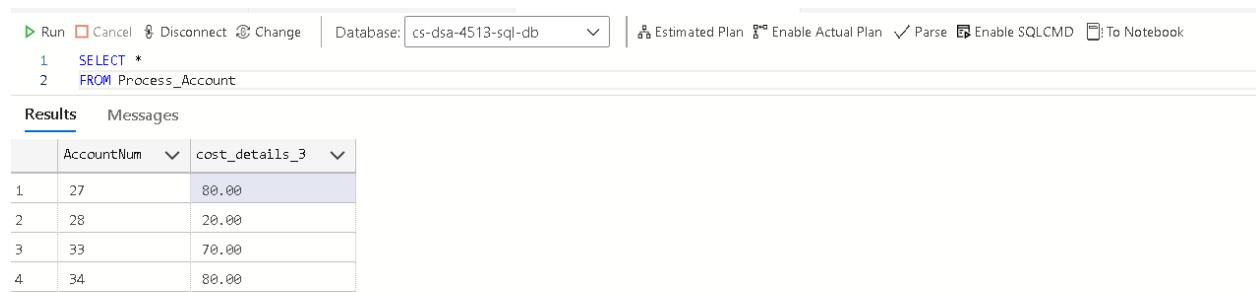
```
1 SELECT *
2 FROM Cut_Job
```

Results Messages

	JobNum	machine_type_used	time_machine_used	material_used	labor_time
1	41	Inclined	40.55	Metal	25.54
2	43	axle	40.43	textile	78.30
3	46	Pulley	34.33	wood	7.98

Screenshots showing the testing of query 8

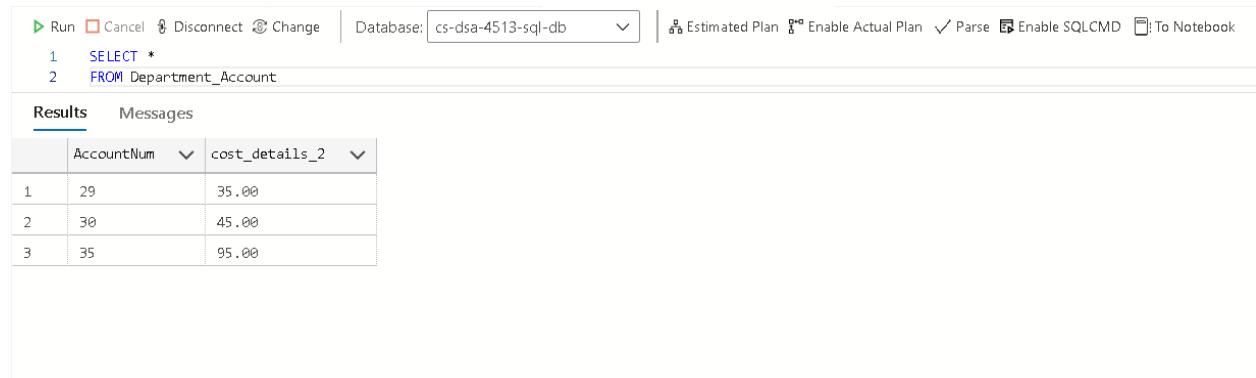
Before the cost_details values of each account before adding the sup_cost value to the cost_details.



```
▶ Run □ Cancel ⌂ Disconnect ⌂ Change | Database: cs-dsa-4513-sql-db | ⌂ Estimated Plan ⌂ Enable Actual Plan ✓ Parse ⌂ Enable SQLCMD ⌂ To Notebook
1 SELECT *
2 FROM Process_Account
```

Results Messages

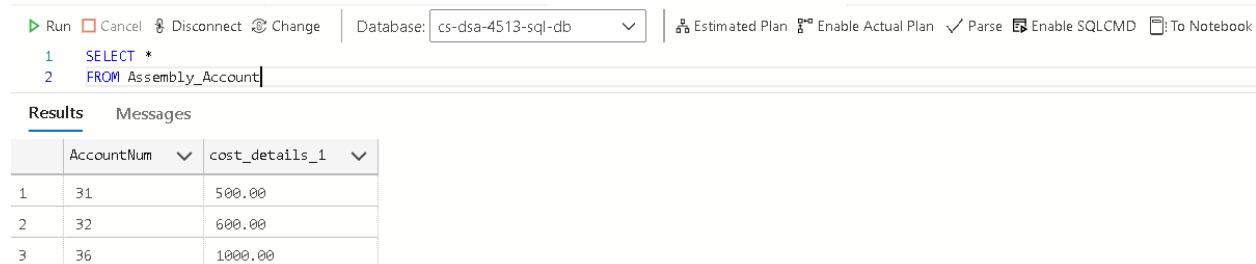
	AccountNum	cost_details_3
1	27	80.00
2	28	20.00
3	33	70.00
4	34	80.00



```
▶ Run □ Cancel ⌂ Disconnect ⌂ Change | Database: cs-dsa-4513-sql-db | ⌂ Estimated Plan ⌂ Enable Actual Plan ✓ Parse ⌂ Enable SQLCMD ⌂ To Notebook
1 SELECT *
2 FROM Department_Account
```

Results Messages

	AccountNum	cost_details_2
1	29	35.00
2	30	45.00
3	35	95.00



```
▶ Run □ Cancel ⌂ Disconnect ⌂ Change | Database: cs-dsa-4513-sql-db | ⌂ Estimated Plan ⌂ Enable Actual Plan ✓ Parse ⌂ Enable SQLCMD ⌂ To Notebook
1 SELECT *
2 FROM Assembly_Account
```

Results Messages

	AccountNum	cost_details_1
1	31	500.00
2	32	600.00
3	36	1000.00

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
8
What's the transaction number?
71
What's the sup cost?
70
What's the account number for transaction?
27
Done!
```

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
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    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
8
What's the transaction number?
72
What's the sup cost?
80
What's the account number for transaction?
28
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
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7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
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affected accounts by adding sup-cost to their current values of details  
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11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
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14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
8  
What's the transaction number?  
73  
What's the sup cost?  
90  
What's the account number for transaction?  
29  
Done!
```

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
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7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
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affected accounts by adding sup-cost to their current values of details  
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(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
8  
What's the transaction number?  
74  
What's the sup cost?  
100  
What's the account number for transaction?  
30  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
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(in datecommenced order) and the department responsible for each process  
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13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
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(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
8  
What's the transaction number?  
75  
What's the sup cost?  
110  
What's the account number for transaction?  
31  
Done!
```

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
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14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
8  
What's the transaction number?  
76  
What's the sup cost?  
120  
What's the account number for transaction?  
32  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
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affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
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13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
8
What's the transaction number?
77
What's the sup cost?
130
What's the account number for transaction?
33
Done!
```

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
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5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
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9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
8
What's the transaction number?
78
What's the sup cost?
140
What's the account number for transaction?
34
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
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14. Change the color of a given paint job  
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(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
8  
What's the transaction number?  
79  
What's the sup cost?  
150  
What's the account number for transaction?  
35  
Done!
```

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
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affected accounts by adding sup-cost to their current values of details  
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(in datecommenced order) and the department responsible for each process  
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(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
8  
What's the transaction number?  
80  
What's the sup cost?  
160  
What's the account number for transaction?  
36  
Done!
```

JOB-SHOP ACCOUNTING SYSTEM

Affected tables are:

Run Cancel Disconnect Change Database: cs-dsa-4513-sql-db Estimated Plan Enable Actual Plan Parse Enable SQLCMD To Notebook

```
1 SELECT *
2 FROM Process_Account
```

Results Messages

	AccountNum	cost_details_3
1	27	150.00
2	28	100.00
3	33	200.00
4	34	220.00

Run Cancel Disconnect Change Database: cs-dsa-4513-sql-db Estimated Plan Enable Actual Plan Parse Enable SQLCMD To Notebook

```
1 SELECT *
2 FROM Assembly_Account
```

Results Messages

	AccountNum	cost_details_1
1	31	610.00
2	32	720.00
3	36	1160.00

Run Cancel Disconnect Change Database: cs-dsa-4513-sql-db Estimated Plan Enable Actual Plan Parse Enable SQLCMD To Notebook

```
1 SELECT *
2 FROM Department_Account
```

Results Messages

	AccountNum	cost_details_2
1	29	125.00
2	30	145.00
3	35	245.00

JOB-SHOP ACCOUNTING SYSTEM

▶ Run Cancel Disconnect Change | Database: cs-dsa-4513-sql-db | Estimated Plan Enable Actual Plan Parse Enable SQLCMD To Notebook

```

1  SELECT *
2  FROM Transactions

```

Results Messages

	TransactionsNum	AccountNum	sup_cost
1	71	27	70.00
2	72	28	80.00
3	73	29	90.00
4	74	30	100.00
5	75	31	110.00
6	76	32	120.00
7	77	33	130.00
8	78	34	140.00
9	79	35	150.00
10	80	36	160.00

▶ Run Cancel Disconnect Change | Database: cs-dsa-4513-sql-db | Estimated Plan Enable Actual Plan Parse Enable SQLCMD To Notebook

```

1  SELECT *
2  FROM Proceeds

```

Results Messages

	TransactionsNum	JobNum
1	71	NULL
2	72	NULL
3	73	NULL
4	74	NULL
5	75	NULL
6	76	NULL
7	77	NULL
8	78	NULL
9	79	NULL
10	80	NULL

JOB-SHOP ACCOUNTING SYSTEM

Screenshots showing the testing of query 9

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
9  
What's the assembly id?  
22  
Done!  
Total cost: 720.0000
```

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
9  
What's the assembly id?  
26  
Done!  
Total cost: 1160.0000
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
9  
What's the assembly id?  
27  
Done!  
Total cost: null
```

Affected tables:

▶ Run □ Cancel ⚙ Disconnect ⚙ Change Database: cs-dsa-4513-sql-db ▾ Estimated Plan ⚙ Enable Actual Plan ✓ Parse ⚙ Enable SQLCMD ⚙ To Notebook

```
1  SELECT *  
2  FROM Maintains_Assemblies|
```

Results Messages

	AssemblyID	AccountNum
1	22	32
2	26	36

▶ Run □ Cancel ⚙ Disconnect ⚙ Change Database: cs-dsa-4513-sql-db ▾ Estimated Plan ⚙ Enable Actual Plan ✓ Parse ⚙ Enable SQLCMD ⚙ To Notebook

```
1  SELECT *  
2  FROM Assembly_Account|
```

Results Messages

	AccountNum	cost_details_1
1	31	610.00
2	32	720.00
3	36	1160.00

Screenshots showing the testing of query 10.

The total labor time is in minutes in the screenshots.

```
WELCOME TO THE JOB-SHOP ACCOUNTING DATABASE SYSTEM

Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
10
What's the department number?
3
What's the job completed date:
01-30-2023
Done!
Total labor time within department 3 is :524.0000
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
10  
What's the department number?  
2  
What's the job completed date:  
01-26-2023  
Done!  
Total labor time within department 2 is :1554.0000
```

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
10  
What's the department number?  
1  
What's the job completed date:  
01-23-2023  
Done!  
Total labor time within department 1 is :650.0000
```

JOB-SHOP ACCOUNTING SYSTEM

Screenshots showing the testing of query 11.

```
WELCOME TO THE JOB-SHOP ACCOUNTING DATABASE SYSTEM

Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
11
What's the assembly id?
18
Connecting to the database...
outputing the query...
Done.

Process for assembly id: 18, and its department number; sorted by date commenced.
ProcessID | DepartmentNum
7 | 1
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
11  
What's the assembly id?  
20  
Connecting to the database...  
outputing the query...  
Done.  
  
Process for assembly id: 20, and its department number; sorted by date commenced.  
ProcessID | DepartmentNum  
9 | 2
```

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
11  
What's the assembly id?  
21  
Connecting to the database...  
outputing the query...  
Done.  
  
Process for assembly id: 21, and its department number; sorted by date commenced.  
ProcessID | DepartmentNum  
10 | 3
```

Screenshots showing the testing of query 12.

```
ghulam_task_6 [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (Nov 16, 2023, 1:02:27 AM) [pid: 17736]
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
12
What's the starting category (1-10)
1
What's the ending category (1-10)
4
Done!
Outputting the query...
Done.

Jobs from starting date 1 completed on: 4
The customer names are in the selected category range:
Ahmed
Amin
Iqbal
Mujtaba
Mahid
```

JOB-SHOP ACCOUNTING SYSTEM

```
ghulam_task_6 [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (Nov 16, 2023, 1:02:27 AM) [pid: 17736]
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
12
What's the starting category (1-10)
1
What's the ending category (1-10)
3
Done!
Outputting the query...
Done.

Jobs from starting date 1 completed on: 3
The customer names are in the selected category range:
Ahmed
Amin
Iqbal
Mujtaba
```

JOB-SHOP ACCOUNTING SYSTEM

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit
```

Enter your option :

12
What's the starting category (1-10)
1
What's the ending category (1-10)
2
Done!
Outputting the query...
Done.

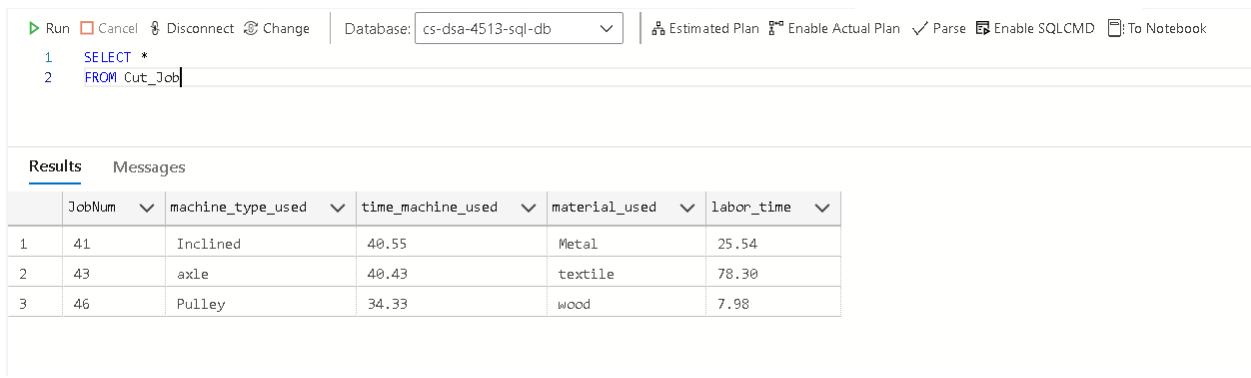
Jobs from starting date 1 completed on: 2
The customer names are in the selected category range:
Ahmed
Amin
Iqbal

Screenshots showing the testing of query 13.

My Cut_Job table before running the query 13. This way, it will be easy to follow query 13.

Find the updated screenshot of the Cut_Job table after each screenshot running query 13

(deletion).



The screenshot shows a SQL query window in SSMS. The query is:

```
1 SELECT *
2 FROM Cut_Job
```

The results pane displays the following data:

	JobNum	machine_type_used	time_machine_used	material_used	labor_time
1	41	Inclined	40.55	Metal	25.54
2	43	axle	40.43	textile	78.30
3	46	Pulley	34.33	wood	7.98

13.1 Nothing changes since there were no cut jobs between the following ranges.

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
13  
What's the starting job number?  
37  
What's the ending job number?  
40  
Done!
```

```
▶ Run □ Cancel ⚙ Disconnect ⚙ Change Database: cs-dsa-4513-sql-db ▾ ⚙ Estimated Plan ⚙ Enable Actual Plan ✓ Parse ⚙ Enable SQLCMD ⚙ To Notebook  
1 SELECT *  
2 FROM Cut_Job
```

Results Messages

	JobNum	machine_type_used	time_machine_used	material_used	labor_time
1	41	Inclined	40.55	Metal	25.54
2	43	axle	40.43	textile	78.30
3	46	Pulley	34.33	wood	7.98

13.2

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
13  
What's the starting job number?  
40  
What's the ending job number?  
45  
Done!
```

▶ Run □ Cancel ⌂ Disconnect ⌂ Change | Database: cs-dsa-4513-sql-db ▾ | ⚡ Estimated Plan ⚡ Enable Actual Plan ✓ Parse ⌂ Enable SQLCMD ⌂ To Notebook

```
1  SELECT *  
2  FROM Cut_Job
```

Results Messages

	JobNum	machine_type_used	time_machine_used	material_used	labor_time
1	46	Pulley	34.33	wood	7.98

13.3

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
(the user must be asked to enter the input file name).  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen (the user must be asked to enter the output file name).  
17. Quit  
  
Enter your option :  
13  
What's the starting job number?  
45  
What's the ending job number?  
50  
Done!
```

▶ Run □ Cancel ⌓ Disconnect ⌓ Change | Database: cs-dsa-4513-sql-db ▾ | ⌓ Estimated Plan ⌓ Enable Actual Plan ✓ Parse ⌓ Enable SQLCMD □ To Notebook

```
1  SELECT *  
2  FROM Cut_Job
```

Results Messages

JobNum	machine_type_used	time_machine_used	material_used	labor_time
1	Lathe	100	10	10

Screenshots showing the testing of query 14.

Paint Job table before running the query 14.

The screenshot shows a SQL query window with the following content:

```
Run Cancel Disconnect Change Database: cs-dsa-4513-sql-db Estimated Plan Enable Actual Plan Parse Enable SQLCMD To Notebook
1  SELECT *
2  FROM Paint_Job
```

The results pane displays the following data:

	JobNum	color	volume	labor_time
1	37	Blue	5.25	10.50
2	38	Purple	20.25	35.00
3	44	lime	4.32	6.53

14.1

The screenshot shows a terminal window with the following text:

```
ghulam_task_6 [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (Nov 16, 2023, 1:25:19 AM) [pid: 21464]
WELCOME TO THE JOB-SHOP ACCOUNTING DATABASE SYSTEM

Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly,
   or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
14
What's the job number?
37
What's the color?
Red
done!
```

JOB-SHOP ACCOUNTING SYSTEM

▶ Run □ Cancel ⚙ Disconnect ⚙ Change | Database: cs-dsa-4513-sql-db ▾ | ⚙ Estimated Plan ⚙ Enable Actual Plan ✓ Parse ⚙ Enable SQLCMD ⚙ To Notebook

```

1  SELECT *
2  FROM Paint_Job

```

Results

	JobNum	color	volume	labor_time
1	37	Red	5.25	10.50
2	38	Purple	20.25	35.00
3	44	lime	4.32	6.53

14.2

```

Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
14
What's the job number?
38
What's the color?
Orange
Done!

```

JOB-SHOP ACCOUNTING SYSTEM

The screenshot shows a SQL query being run in SSMS. The query is:

```

1 SELECT *
2 FROM Paint_Job

```

The results grid displays the following data:

	JobNum	color	volume	labor_time
1	37	Red	5.25	10.50
2	38	Orange	20.25	35.00
3	44	lime	4.32	6.53

14.3

```

Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
    (the user must be asked to enter the input file name).
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen (the user must be asked to enter the output file name).
17. Quit

Enter your option :
14
What's the job number?
44
What's the color?
Black
Done!

```

JOB-SHOP ACCOUNTING SYSTEM

Run	Cancel	Disconnect	Change	Database:	cs-dsa-4513-sql-db	Estimated Plan	Actual Plan	Parse	Enable SQLCMD	To Notebook
1	SELECT *			2	FROM Paint_Job					

JobNum	color	volume	labor_time
1	Red	5.25	10.50
2	Orange	20.25	35.00
3	Black	4.32	6.53

Screenshots showing the testing of query 15.

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen  
17. Quit  
  
Enter your option :  
15  
***** Copy the .csv file path you want to read *****  
C:\Users\ghula\OneDrive\Desktop\input.csv  
Dispatching the query...  
Done. 5 rows inserted.
```

JOB-SHOP ACCOUNTING SYSTEM

The screenshot shows a SQL query being run in SSMS. The query is:

```
1 SELECT *
2 FROM Customer
```

The results are displayed in a table with three columns: CustomerName, Customer_Address, and category. The data is as follows:

	CustomerName	Customer_Address	category
1	Ahmed	Sindh	2
2	Amin	Karachi	1
3	Faiza	Kabul	9
4	Imam	Kabul	9
5	Iman	Kabul	8
6	Iqbal	Karachi	1
7	Khair	Kabul	8
8	Mujtaba	Gilgit	3
9	Murid	Shughnan	5
10	Nabeel	Karachi	10
11	Naqeeb	Karachi	10
12	Sultan	Karachi	9
13	Wahid	Kabul	4
14	Yasir	Karachi	9
15	Yawar	Shughnan	5

Screenshots showing the testing of query 16.

```
Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen
17. Quit

Enter your option :
16
Please enter MIN category number (integer from 1 - 10, inclusive):
1
Please enter MAX category number (integer from 1 - 10, inclusive):
4
Please enter the file location path?
C:\Users\ghula\OneDrive\Desktop\output1
Dispatching the query...
Done. File Location here:
C:\Users\ghula\OneDrive\Desktop\output1.csv
```

JOB-SHOP ACCOUNTING SYSTEM

The file output picture & database table picture:

Run Cancel Disconnect Change Database: cs-dsa-4513-sql-db Estimated Plan Enable Actual Plan Parse Enable SQLCMD To Notebook

```

1 SELECT *
2 FROM Customer
3 WHERE category BETWEEN 1 and 4

```

Results Messages

	CustomerName	Customer_Address	category
1	Ahmed	Sindh	2
2	Amin	karachi	1
3	Iqbal	Karachi	1
4	Mujtaba	Gilgit	3
5	Wahid	Kabul	4

The screenshot shows a Microsoft Excel spreadsheet titled "output1" with the status bar indicating it is saved to this PC. The ribbon menu is visible at the top, and the Home tab is selected. The table contains the same data as the previous screenshot, with columns labeled "name", "address", and "category". The data rows are numbered 1 through 6. The Excel interface includes various toolbars and a formula bar with the text "name".

	name	address	category
1	Ahmed	Sindh	2
2	Amin	karachi	1
3	Iqbal	Karachi	1
4	Mujtaba	Gilgit	3
5	Wahid	Kabul	4
6			
7			
8			

Screenshots showing the testing of query 17.

```
Please select one of the options below:  
1. Enter a new customer  
2. Enter a new department  
3. Enter a new process-id and its department together with its type and information relevant to the type  
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,  
and dateordered and associate it with one or more processes  
5. Create a new account and associate it with the process, assembly, or department to which it is applicable  
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced  
7. At the completion of a job, enter the date it completed and the information relevant to the type of job  
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the  
affected accounts by adding sup-cost to their current values of details  
9. Retrieve the total cost incurred on an assembly-id  
10. Retrieve the total labor time within a department for jobs completed in the department during a given date  
11. Retrieve the processes through which a given assembly-id has passed so far  
(in datecommenced order) and the department responsible for each process  
12. Retrieve the customers (in name order) whose category is in a given range  
13. Delete all cut-jobs whose job-no is in a given range  
14. Change the color of a given paint job  
15. Import: enter new customers from a data file until the file is empty  
16. Export: Retrieve the customers (in name order) whose category is in a given  
range and output them to a data file instead of screen  
17. Quit  
  
Enter your option :  
17  
Exiting! Good-buy!
```

Screenshots demonstrate that Azure SQL Database can detect errors.

1. Primary Key Constraint Violation

```
WELCOME TO THE JOB-SHOP ACCOUNTING DATABASE SYSTEM

Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen
17. Quit

Enter your option :
1
What's the customer name?
Iqbal
What's the customer address?
Norman
What's the customer category (1-10?
3
Done!
Exception in thread "main" com.microsoft.sqlserver.jdbc.SQLServerException: Violation of PRIMARY KEY constraint 'PK_Customer_7A22C6EB9DCEFF427'. Cannot
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerException.makeFromDatabaseError(SQLServerException.java:265)
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerStatement.getNextResult(SQLServerStatement.java:167)
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerPreparedStatement.doExecutePreparedStatement(SQLServerPrepare
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerPreparedStatement$PrepStmtExecCmd.doExecute(SQLServerPrepared
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.TDSCommand.execute(IOBuffer.java:7620)
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerConnection.executeCommand(SQLServerConnection.java:3916)
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerStatement.executeCommand(SQLServerStatement.java:268
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerStatement.executeStatement(SQLServerStatement.java:770).
```

2. Range Constraint Violation

```

WELCOME TO THE JOE-SHOP ACCOUNTING DATABASE SYSTEM

Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
    (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
16. Export: Retrieve the customers (in name order) whose category is in a given
    range and output them to a data file instead of screen
17. Quit

Enter your option :
1
What's the customer name?
Asif
what's the customer address?
Norman
what's the customer category (1-10?
11
Done!
Exception in thread "main" com.microsoft.sqlserver.jdbc.SQLServerException: The INSERT statement conflicted with the CHECK constraint "CK_Customer_cat". The conflict occurred on the column 'category'. The statement has been terminated.
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerException.makeFromDatabaseError(SQLServerException.java:265)
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerStatement.getNextResult(SQLServerStatement.java:1676)
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerPreparedStatement.doExecutePreparedStatement(SQLServerPrepare
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerPreparedStatement$PrepStmtExecCmd.doExecute(SQLServerPrepared
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.TDSCommand.execute(IOBuffer.java:7620)
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerConnection.executeCommand(SQLServerConnection.java:3916
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerStatement.executeUpdateCommand(SQLServerStatement.java:268)
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerStatement.executeUpdate(SQLServerStatement.java:242)

```

JOB-SHOP ACCOUNTING SYSTEM

3. Foreign Key Constraint Violation

```
<terminated> ghulam_task_6 [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (Nov 16, 2023, 8:59:36 PM - 9:02:19 PM) [pid:13448]
WELCOME TO THE JOB-SHOP ACCOUNTING DATABASE SYSTEM

Please select one of the options below:
1. Enter a new customer
2. Enter a new department
3. Enter a new process-id and its department together with its type and information relevant to the type
4. Enter a new assembly with its customer-name, assembly-details, assembly-id,
   and dateordered and associate it with one or more processes
5. Create a new account and associate it with the process, assembly, or department to which it is applicable
6. Enter a new job, given its job-no, assembly-id, process-id, and date the job commenced
7. At the completion of a job, enter the date it completed and the information relevant to the type of job
8. Enter a transaction-no and its sup-cost and update all the costs (details) of the
   affected accounts by adding sup-cost to their current values of details
9. Retrieve the total cost incurred on an assembly-id
10. Retrieve the total labor time within a department for jobs completed in the department during a given date
11. Retrieve the processes through which a given assembly-id has passed so far
   (in datecommenced order) and the department responsible for each process
12. Retrieve the customers (in name order) whose category is in a given range
13. Delete all cut-jobs whose job-no is in a given range
14. Change the color of a given paint job
15. Import: enter new customers from a data file until the file is empty
16. Export: Retrieve the customers (in name order) whose category is in a given
   range and output them to a data file instead of screen
17. Quit

Enter your option :
8
What's the transaction number?
90
What's the sup cost?
900
What's the account number for transaction?
90000
Done!
Exception in thread "main" com.microsoft.sqlserver.jdbc.SQLServerException: The INSERT statement conflicted with the FOREIGN KEY constraint "FK_Transac
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerException.makeFromDatabaseError(SQLServerException.java:265)
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerStatement.getNextResult(SQLServerStatement.java:1676)
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerPreparedStatement.doExecutePreparedStatement(SQLServerPrepare
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerPreparedStatement$PrepStmtExeclCmd.doExecute(SQLServerPrepared
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.TDSCommand.execute(IOBuffet.java:7620)
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerConnection.executeCommand(SQLServerConnection.java:3916)
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerStatement.executeUpdateCommand(SQLServerStatement.java:268)
at com.microsoft.sqlserver.jdbc@11.2.3.jre17/com.microsoft.sqlserver.jdbc.SQLServerStatement.executeStatement(SQLServerStatement.java:240)
```

Task 7:**Customer Database:**

- Customer Name: Gulam
- Address: Karachi
- Category: 8

Was successfully inserted.[Get all customers.](#)

Name:	
Customer Name:	Gulam
Home Address:	Karachi
Category(1 to 10):	8
<input type="button" value="Clear"/>	<input type="button" value="Insert"/>

customer_name	address	category
Gulam	Karachi	8

← → C ⓘ localhost:8080/jspazuretest/getallcustomers.jsp

customer_name	address	category
Gulam	Karachi	8