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Grade	**87.50** out of 100.00

Question **1**

Correct

Mark 5.00 out of 5.00

Consider the following recovery log obtained from a DBMS X after a crash occurred.

```
<T0 start>
<T0, A, 100, 200>
<T0, B, 200, 150>
<T0, C, 300, 1000
<T0 commit>
<T1 start>
<T1, C, 1000, 40>
<T1 commit>
<T2 start>
<T2, A, 200, 400>
<T3 start>
<T2, C, 40, 300>
<T4 start>
<T4, D, 20, 100>
<T4 commit>
<T3, B, 150, 500>
<T5 start>
<T3 commit>
<T5, B, 500, 3000>
```

Which transactions need to be undone from the DB?

Select one:

- a. All transactions
- b. T3
- c. T5
- d. No transactions needs to be undone.

e. T2 and T5 ✔

f. T4

g. T2

Your answer is correct.

Correct

Marks for this submission: 5.00/5.00.

Question **2**

Correct

Mark 5.00 out of 5.00

Suppose a set $S = \{Joe, Bob, Ned, Ron, Jil, Jen, Ken, Li, Lo, Lu, Moe, Apu\}$. What is the size of 2^S.

Note: Do not use decimals

Answer: 4096 ✔

Correct

Marks for this submission: 5.00/5.00.

Question **3**

Incorrect

Mark 0.00 out of 5.00

Consider the following relational schema:

```
Customer(cId serial primary key, cName char(10), cAddr char(100), cAge integer)

Movie(mId serial primary key, mName char(10), mRuntime float, mRating char(5))

Theater(tId serial primary key, tName char(10), tCapacity integer, tAddr char(20))

TheaterVisit(vId serial primary key, mId integer references Movie(mId), tId integer references
Theater(tId), cId integer references Customer(cId), vCost money);
```

Consider the query: **Find the name, capacity and address for all theaters showing an R-rated movie that lasts longer than 2 hours.**

Which of the following relational expressions solves this query**?**

Select one or more:

- [x] a. $\sigma_{mRating='R' \wedge mRuntime>2.0}(\pi_{tName,tCapacity,tAddr}(Movie \bowtie TheaterVisit \bowtie Theater))$
- [x] b. $\sigma_{mRating='R' \wedge mRuntime>2.0}(\pi_{tName,tCapacity,tAddr,mRating}(Movie \bowtie TheaterVisit \bowtie Theater))$
- [ ] c. $\sigma_{mRating='R'}(\pi_{tName,tCapacity,tAddr}(\sigma_{mRuntime>2.0}(Movie) \bowtie TheaterVisit \bowtie Theater))$
- [ ] d. Both a and c
- [ ] e. All of the above
- [ ] f. None of the above

Your answer is incorrect.

Incorrect

Marks for this submission: 0.00/5.00.

Question **4**

Correct

Mark 5.00 out of 5.00

Consider a disk with a sector size of 512 bytes, a block size of 2 sectors, 4000 tracks per surface, 80 sectors per track, seven (7) double-sided platters, average seek time of 12 msecs, average rotational delay of 6 msecs, and transfer rate of 15 MB/sec. **What is the total amount of data, in number of bytes, that you can store in a RAID 5 system consisting of 20 of these disks, organized into 1 reliability group with one disk worth of parity data?**

Select one:

- a. Cannot be determined from the information given
- b. 40.66 GB ✔
- c. 42.8 GB
- d. 21.4 GB
- e. 20.33 GB

Your answer is correct.

Correct

Marks for this submission: 5.00/5.00.

Question **5**

Correct

Mark 5.00 out of 5.00

Consider the following sqlite tables:

```
parts(pid integer primary key, pname text, pmaterial text, pcolor text, pprice float)

supplier (sid integer primary key, sname text, scity text, sphone text)

supplies (pid integer references parts(pid), sid integer references supplier(sid), stock integer, primary key (pid, sid))
```

Use SQLite syntax to write SQL for the following query: **Find id, name, and city for suppliers that supply a steel part.**

For example:

Test	Result
-- Case 1	sid sname scity ---------- ---------- ---------- 2 Sears SF 3 Pep Boys NY 4 Lugo PR SJ 6 Manny Boat SJ

Answer: (penalty regime: 0 %)

```
1 select distinct sid, sname, scity
2 from parts natural inner join supplies natural inner join supplier
3 where pmaterial='steel'
4 order by sid
5
```

	Test	Expected			Got			
✔	-- Case 1	sid	sname	scity	sid	sname	scity	✔
		----------	----------	----------	----------	----------	----------	
		2	Sears	SF	2	Sears	SF	
		3	Pep Boys	NY	3	Pep Boys	NY	
		4	Lugo PR	SJ	4	Lugo PR	SJ	
		6	Manny Boat	SJ	6	Manny Boat	SJ	
✔	-- Case 2	sid	sname	scity	sid	sname	scity	✔
		----------	----------	----------	----------	----------	----------	
		2	Sears	SF	2	Sears	SF	
		4	Lugo PR	SJ	4	Lugo PR	SJ	
		6	Manny Boat	SJ	6	Manny Boat	SJ	

Passed all tests! ✔

Correct

Marks for this submission: 5.00/5.00.

Question **6**

Correct

Mark 5.00 out of 5.00

Consider a disk with a sector size of 512 bytes, a block size of 2 sectors, 4000 tracks per surface, 80 sectors per track, seven (7) double-sided platters, average seek time of 12 msecs, average rotational delay of 6 msecs, and transfer rate of 15 MB/sec. **What is the minimum (best) time it will take to read 5000 blocks of data from the disk if the I/O occurs using a sequential access pattern?**

Select one:

- a. 1.84 secs
- b. 370 secs
- c. Cannot be determined from the information given
- d. 0.37 secs ✔
- e. 90.35 secs

Your answer is correct.

Correct

Marks for this submission: 5.00/5.00.

Question **7**

Incorrect

Mark 0.00 out of 5.00

Consider a RAID level 10 (0+1) organization with 4 disks and one reliability group. Suppose that disk 2 is the mirror of disk 0, and disk 3 is the mirror of disk 1. Suppose that disk 0 holds pages 726, 12, 14, 27 and 28. Similarly, suppose that disk 1 holds pages 98, 26, 15, and 1. If one I/0 takes 10 ms and parallel I/Os are submitted instantaneously to disks not busy, then how long it takes to read the following pages: 726, 12, 98, 15, 28, 1, 26, 14? Hint: (I/O requests to disk not busy run in parallel. But you wait when a disk is busy and no more tasks can be done until it finishes. You can get a block from any copy in the array. Make a diagram.)

Select one:

- a. 10
- b. No Option is correct
- c. 20
- d. 30
- e. 40
- f. 50 ✖

Your answer is incorrect.

Incorrect

Marks for this submission: 0.00/5.00.

Question **8**

Correct

Mark 2.50 out of 5.00

Updating a column has the effect of erasing the old value in the column for a given record, and replacing the value with a new one.

Which of the following applications could tolerate this type of update without creating problems?

Select one:

- a. Medical application that tracks the vital signs of a person.
- b. Application for a pharmaceutical plant that tracks temperature at the production line for medications.
- c. Financial application that keeps track of the account balances.
- d. Student records application that keeps track of student grades.
- e. Both c and d
- f. None of the above ✔

Your answer is correct.

Correct

Marks for this submission: 5.00/5.00. Accounting for previous tries, this gives **2.50/5.00**.

Question **9**

Correct

Mark 5.00 out of 5.00

An ***append-only*** DBMS neither updates nor deletes records, but only adds new records, greatly simplifying transaction support. Which of the following applications can benefit from this type of DBMS? (There could more than one).

Select one or more:

- a. Vital signs monitor at a hospital. ✔
- b. Airport temperature measuring stations. ✔
- c. Electric energy consumption meter at a home. ✔
- d. Facebook status post system.

Your answer is correct.

Correct

Marks for this submission: 5.00/5.00.

Question **10**

Correct

Mark 5.00 out of 5.00

In two-phase locking, a transaction T might release or downgrade a lock, but cannot acquire new locks.

Select one:

- a. True ✔
- b. True only if the transaction is serializable.
- c. False
- d. Cannot be determined from the premise.

Your answer is correct.

Correct

Marks for this submission: 5.00/5.00.

Question **11**

Correct

Mark 5.00 out of 5.00

Consider the following recovery log obtained from a DBMS X after a crash occurred.

```
<T0 start>
<T0, A, 100, 200>
<T0, B, 200, 150>
<T0, C, 300, 1000
<T0 commit>
<T1 start>
<T1, C, 1000, 40>
<T1 commit>
<T2 start>
<T2, A, 200, 400>
<T3 start>
<T2, C, 40, 300>
<T4 start>
<T4, D, 20, 100>
<T4 commit>
<T3, B, 150, 500>
<T5 start>
<T3 commit>
<T5, B, 500, 3000>
```

What will be the values of A, B, C, and D after recovery is completed?

Select one:

- a. A=400, B=3000, C=40, D=100
- b. A=100, B=200, C=300, D=20
- c. A=400, B=3000, C=300, D=20
- d. A=200, B=3000, C=300, D=100

e. A=200, B=500, C=40, D=100 ✔

Your answer is correct.

Correct

Marks for this submission: 5.00/5.00.

Question **12**

Correct

Mark 5.00 out of 5.00

Consider a RAID 5 array with 10 disks organized into one reliability group containing 1 check disk worth of parity information. What is the effective space utilization for this array?

Select one:

a. 10%

b. 50%

c. None of the answers is right.

d. 1%

e. 100%

f. 90% ✔

Your answer is correct.

Correct

Marks for this submission: 5.00/5.00.

Question **13**

Correct

Mark 5.00 out of 5.00

Suppose we have a single disk with a Mean Time to Failure of 32,000 hours. If we propose, as consultants, to the ACME company a RAID level 0 organization with 50 disks. On average, how long we wait for the first call asking for support because disk failure (assume any disk can fail with equal probability)?

Select one:

- a. 62 days
- b. 3.66 years
- c. Never, RAID does not fail.
- d. 125 days
- e. 26.67 days ✔

Your answer is correct.

Correct

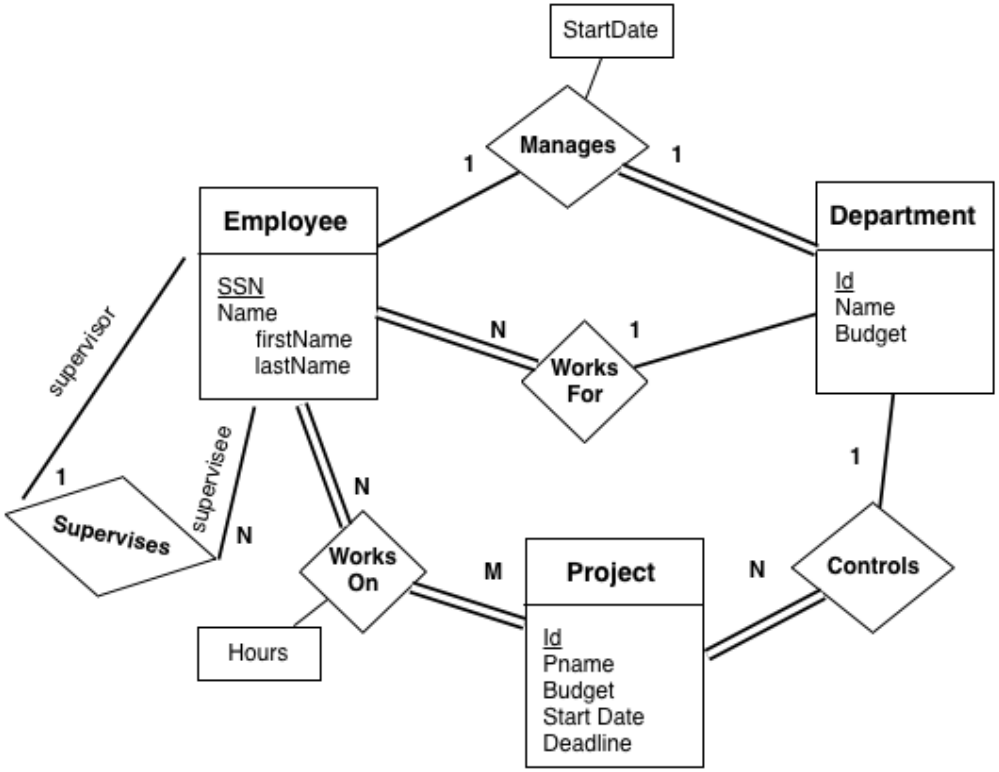
Marks for this submission: 5.00/5.00.

Question **14**

Correct

Mark 5.00 out of 5.00

Consider the following ER Diagram:



Suppose that the cardinality of entity **Project** is 10 and the cardinality of entity of **Employee** is 2,000.

*How many records from entity **Employee** will participate in relationship **WorksOn?***

Answer: 2000 ✔

Correct

Marks for this submission: 5.00/5.00.

Question **15**

Correct

Mark 5.00 out of 5.00

Consider the following sqlite tables:

```
parts(pid integer primary key, pname text, pmaterial text, pcolor text, pprice float)

supplier (sid integer primary key, sname text, scity text, sphone text)

supplies (pid integer references parts(pid), sid integer references supplier(sid), stock integer, primary key (pid, sid))

customer (cid integer primary key, cname text, ccity text, cphone text);
```

-- puchases made by customer on part from a supplier, qty indicates number of parts purchased (price comes from parts table)

```
purchase (purid integer primary key, cid integer references customer(cid), pid integer references parts(pid), sid integer references supplier(sid), qty integer)
```

Use SQLite syntax to write SQL for the following query: **Find the total amount of money spent by each customer ordered by descending customer id.**

For example:

Test	Result
-- Case 1	cid sum(qty*pprice) ---------- --------------- 8 45.0 6 8.0 4 21.0 3 32.5 2 850.0 1 12.2

Answer: (penalty regime: 0 %)

```
select customer.cid, sum(qty*pprice)
from customer
natural inner join purchase
natural inner join parts

where purchase.cid = customer.cid
group by customer.cid
order by customer.cid desc
```

	Test	Expected		Got		
✔	-- Case 1	cid	sum(qty*pprice)	cid	sum(qty*pprice)	✔
		8	45.0	8	45.0	
		6	8.0	6	8.0	
		4	21.0	4	21.0	
		3	32.5	3	32.5	
		2	850.0	2	850.0	
		1	12.2	1	12.2	

	Test	Expected		Got		
✔	-- Case 2	cid	sum(qty*pprice)	cid	sum(qty*pprice)	✔
		----------	---------------	----------	---------------	
		8	45.0	8	45.0	
		6	8.0	6	8.0	
		5	2.0	5	2.0	
		4	21.0	4	21.0	
		3	32.5	3	32.5	
		2	850.0	2	850.0	
		1	12.2	1	12.2	

Passed all tests! ✔

Correct

Marks for this submission: 5.00/5.00.

Question **16**

Correct

Mark 5.00 out of 5.00

In a SQL database server, using the administrator account to run the apps is a valid and sound choice.

a. Cannot be determined from the premise.

b. True, only if encryption and strong passwords are used.

c. True

d. True, only if the encryption is used.

e. False ✔

Your answer is correct.

Correct

Marks for this submission: 5.00/5.00.

Question **17**

Correct

Mark 5.00 out of 5.00

Consider the following sqlite tables:

```
parts(pid integer primary key, pname text, pmaterial text, pcolor text, pprice float)

supplier (sid integer primary key, sname text, scity text, sphone text)

supplies (pid integer references parts(pid), sid integer references supplier(sid), stock integer, primary key (pid, sid))
```

Use SQLite syntax to write SQL for the following query: **Find the id, and name for all parts with at least 20 units in stock by supplier 2;**

For example:

Test	Result
-- Case 1	pid pname ---------- ---------- 1 clavo 2 tuerka 6 zegueta

Answer: (penalty regime: 0 %)

```
1 select pid, pname from parts natural
2 inner join supplies natural inner join
3 supplier where sid = 2 and stock >=20;
```

	Test	Expected		Got		
✔	-- Case 1	pid ---------- 1 2 6	pname ---------- clavo tuerka zegueta	pid ---------- 1 2 6	pname ---------- clavo tuerka zegueta	✔
✔	-- Case 2	pid ---------- 1 2 6 3	pname ---------- clavo tuerka zegueta panel	pid ---------- 1 2 6 3	pname ---------- clavo tuerka zegueta panel	✔

Passed all tests! ✔

Correct

Marks for this submission: 5.00/5.00.

Question **18**

Correct

Mark 5.00 out of 5.00

Consider the following sqlite tables:

```
parts(pid integer primary key, pname text, pmaterial text, pcolor text, pprice float)

supplier (sid integer primary key, sname text, scity text, sphone text)

supplies (pid integer references parts(pid), sid integer references supplier(sid), stock integer, primary key (pid, sid))
```

Use SQLite syntax to write SQL for the following query: **Fing the average part price per material.**

For example:

Test	Result
-- Case 1	pmaterial avg(pprice) ---------- ---------- asbestos 100.2 ceramic 40.0 clay 2.0 madera 4.2 steel 7.57

Answer: (penalty regime: 0 %)

```
select pmaterial, avg(pprice)
from parts
group by pmaterial
```

	Test	Expected	Got	
✔	-- Case 1	pmaterial avg(pprice) ---------- ---------- asbestos 100.2 ceramic 40.0 clay 2.0 madera 4.2 steel 7.57	pmaterial avg(pprice) ---------- ---------- asbestos 100.2 ceramic 40.0 clay 2.0 madera 4.2 steel 7.57	✔
✔	-- Case 2	pmaterial avg(pprice) ---------- ---------- asbestos 100.2 ceramic 40.0 clay 2.0 madera 4.2 plastic 1.99 steel 339.6416666	pmaterial avg(pprice) ---------- ---------- asbestos 100.2 ceramic 40.0 clay 2.0 madera 4.2 plastic 1.99 steel 339.6416666	✔

Passed all tests! ✔

Correct

Marks for this submission: 5.00/5.00.

Question **19**

Correct

Mark 5.00 out of 5.00

Consider a disk with a sector size of 512 bytes, a block size of 2 sectors, 4000 tracks per surface, 80 sectors per track, seven (7) double-sided platters, average seek time of 12 msecs, average rotational delay of 6 msecs, and transfer rate of 15 MB/sec. **What is the total amount of data, in number of bytes, that you can store in a RAID 1 system consisting of 20 of these disks?**

Select one:

- a. 21.4 GB ✔
- b. 20 MB
- c. 42.8 GB
- d. 34 GB
- e. Cannot be determined from the information given

Your answer is correct.

Correct

Marks for this submission: 5.00/5.00.

Question **20**

Correct

Mark 5.00 out of 5.00

Consider the following sqlite tables:

```
parts(pid integer primary key, pname text, pmaterial text, pcolor text, pprice float)

supplier (sid integer primary key, sname text, scity text, sphone text)

supplies (pid integer references parts(pid), sid integer references supplier(sid), stock integer, primary key (pid, sid))
```

Use SQLite syntax to write SQL for the following query: **Find the id, name, and phone for all suppliers that currently supply a part named "tuerka" and have at least one part in stock.**

For example:

Test	Result
-- Case 1	sid sname sphone ---------- ---------- ---------- 2 Sears 789-9483 4 Lugo PR 833-4040 6 Manny Boat 484-4040

Answer: (penalty regime: 0 %)

```
select sid, sname, sphone
from supplier natural inner join supplies natural inner join parts
where pname='tuerka' and stock >=1
```

	Test	Expected			Got			
✔	-- Case 1	sid	sname	sphone	sid	sname	sphone	✔
		----------	----------	----------	----------	----------	----------	
		2	Sears	789-9483	2	Sears	789-9483	
		4	Lugo PR	833-4040	4	Lugo PR	833-4040	
		6	Manny Boat	484-4040	6	Manny Boat	484-4040	
✔	-- Case 2	sid	sname	sphone	sid	sname	sphone	✔
		----------	----------	----------	----------	----------	----------	
		2	Sears	789-9483	2	Sears	789-9483	
		4	Lugo PR	833-4040	4	Lugo PR	833-4040	
		6	Manny Boat	484-4040	6	Manny Boat	484-4040	
		1	Sams	123-0909	1	Sams	123-0909	

Passed all tests! ✔

Correct

Marks for this submission: 5.00/5.00.

◄ Exam 2

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Classroom Project Link