Final Exam

Description

Write your full name and `net_id` on the top right corner of this page.

Answer the <u>database design and application concept questions</u>.

Also complete the <u>logical database design exercises</u>.

Good Luck!

Submission Instructions

Hand-in your exam booklet to an instructor when finished.

If you have un-stapled one or more pages from the booklet during the exam, re-staple them in their original order before handing in the booklet.

Evaluation Criteria

See individual question weights for a break-down.

After being evaluated, each student's submission will be ranked. These rankings may positively impact final grades.

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Section I: Database Design and Application Concepts

Answer each question in English in the space provided.

1. What is the primary goal and purpose of the Normalization process in database design? (10% weight)

2. What quantifiable benefits do businesses or organizations receive from implementing data validation controls on forms that input data into their databases? (5% weight)

3. What is the definition and purpose of an Application Protocol Interface (API)? Name a real world API, describe how it works, and describe the value it brings to one or more businesses or organizations. (10% weight)

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Section II: Logical Database Design

Reference the provided <u>table relations</u>.

For each relation, design a relational database to store the data in the most optimal way. Represent your design by drawing an Entity Relationship Diagram (ERD) in the space provided.

Each ERD should:

- Communicate with clarity the proper logical database design
- Represent all **entities**, and for each:
    - Represent any known or likely **attributes**
    - Denote each **primary key** attribute with `(pk)`; if the primary key is comprised of multiple attributes, denote each composite primary key attribute with `(cpk)`
    - Optionally denote each foreign key attribute with `(fk)`
- Represent all direct **relationships** between entities, and for each:
    - Denote relationship **cardinality**, for each direction
    - Optionally denote relationship optionality, for each direction
    - Optionally describe the relationship in English, for each direction

State assumptions as necessary to justify answers.

You may make scratch-notes, but only ERDs will be considered for evaluation.

1. Video Games (20% weight)

2. Health Inspection Scores (15% weight)

3. Company Blog (20% weight)

4. Chronic Disease Indicators (20% weight)

Relation #1: Video Games

id	name	publisher	pubUrl	year	platId	platform	predecessor	predName
3	Mario Bros.	Nintendo	nintendo.com	1983	1	Nintendo Entertainment System (NES)		
5	Super Mario Bros.	Nintendo	nintendo.com	1985	1	Nintendo Entertainment System (NES)		
7	Super Mario Bros. II	Nintendo	nintendo.com	1988	1	Nintendo Entertainment System (NES)	5	Super Mario Bros.
9	Super Mario Bros. III	Nintendo	nintendo.com	1988	1	Nintendo Entertainment System (NES)	7	Super Mario Bros. II
11	Super Mario 64	Nintendo	nintendo.com	1996	2	Nintendo 64 (N64)		
13	Madden NFL 99	Electronic Arts	ea.com	1998	2	Nintendo 64 (N64)		
15	Super Smash Bros.	Nintendo	nintendo.com	1999	2	Nintendo 64 (N64)		
17	Mario Tennis	Nintendo	nintendo.com	2000	2	Nintendo 64 (N64)		
19	Mario Tennis	Nintendo	nintendo.com	2001	3	Game Boy Color		
21	Super Smash Bros. Melee	Nintendo	nintendo.com	2001	4	Nintendo GameCube		
23	Super Mario Galaxy	Nintendo	nintendo.com	2007	5	Wii		
25	Super Smash Bros. Brawl	Nintendo	nintendo.com	2008	5	Wii		
27	Super Super Galaxy 2	Nintendo	nintendo.com	2010	5	Wii	23	Super Mario Galaxy
29	Madden NFL Football	Electronic Arts	ea.com	2011	6	Nintendo 3DS		

Relation #2: Health Inspection Scores

businesses table

id	name	address
06FOOD-6666	Starbucks	Eye Street
07FOOD-7777	Starbucks	K Street
08FOOD-8888	Dunkin Donuts	22nd Street
09FOOD-9999	Dolcezza	14th Street

inspections table

id	business_id	date	score	type
1	07FOOD-7777	1/1/2015	50	routine
2	08FOOD-8888	1/1/2015	50	routine
3	09FOOD-9999	1/1/2015	100	routine
4	07FOOD-7777	4/4/2015	75	follow-up
5	08FOOD-8888	4/4/2015	75	follow-up

violations table

id	business_id	date	code	description
101	07FOOD-7777	1/1/2015	RR	rats
102	07FOOD-7777	1/1/2015	OO	slight odor
103	08FOOD-8888	1/1/2015	RR	lots of rats all over the basemen
104	08FOOD-8888	1/1/2015	OO	odor
105	07FOOD-7777	4/4/2015	RR	rats
106	08FOOD-8888	4/4/2015	RR	still some rats in the basement

Relation #3: Company Blog

post_id	post_title	author_id	author_name	tags	comment1	commenter1	commenter1_name	comment2	commenter2	commenter2_name
p1	Hello World	u1	Mark		whoa cool.	u5	David	hello back.	u6	Ron
p2	Company Mission	u9	Charlie		totally inspiring.	u15	Janet	i love it.	u17	Bianca
p3	New Feature	u5	David	product, design	looks good.	u15	Janet	change the text color.	u1	Mark
p4	Welcome New Hires	u9	Charlie	human-resources	the new hire is great.	u6	Ron			
p5	Social Media Policies	u9	Charlie	human-resources, social-media	bummer.	u3	Bill			
p6	Privacy and Security Policies	u6	Ron	product, cookies, encryption, authentication						

Relation #4: Chronic Disease Indicators

category	indicatorId	indicator	location	locationName	year	stratId	stratifier	value
Cardiovascular Disease	CVD1_4	Mortality from heart failure (cases per 1K)	DC	District of Columbia	2010	GENM	Male	52.42
Cardiovascular Disease	CVD1_4	Mortality from heart failure (cases per 1K)	DC	District of Columbia	2010	GENF	Female	68.98
Cardiovascular Disease	CVD1_4	Mortality from heart failure (cases per 1K)	DC	District of Columbia	2010	GENT	Total	61.16
Cardiovascular Disease	CVD1_4	Mortality from heart failure (cases per 1K)	VA	Virginia	2010	GENM	Male	69.74
Cardiovascular Disease	CVD1_4	Mortality from heart failure (cases per 1K)	VA	Virginia	2010	GENF	Female	84.44
Cardiovascular Disease	CVD1_4	Mortality from heart failure (cases per 1K)	VA	Virginia	2010	GENT	Total	77.23
Alcohol	ALC2_2	Binge drinking prevalence (%)	DC	District of Columbia	2013	GENM	Male	28.2
Alcohol	ALC2_2	Binge drinking prevalence (%)	DC	District of Columbia	2013	GENF	Female	17.1
Alcohol	ALC2_2	Binge drinking prevalence (%)	DC	District of Columbia	2013	GENT	Total	22.4
Alcohol	ALC2_2	Binge drinking prevalence (%)	VA	Virginia	2013	GENM	Male	22
Alcohol	ALC2_2	Binge drinking prevalence (%)	VA	Virginia	2013	GENF	Female	10.3
Alcohol	ALC2_2	Binge drinking prevalence (%)	VA	Virginia	2013	GENT	Total	15.9
Tobacco	TOB10_0	Sale of cigarette packs (per person)	DC	District of Columbia	2013	GENT	Total	18.6
Tobacco	TOB10_0	Sale of cigarette packs (per person)	VA	Virginia	2013	GENT	Total	69.4
Alcohol	ALC2_2	Binge drinking prevalence (%)	DC	District of Columbia	2015	GENT	Total	20.2
Alcohol	ALC2_2	Binge drinking prevalence (%)	VA	Virginia	2015	GENT	Total	15.7