Milestone 4 - CPSC 304

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Project Description

Our database models publicly traded companies, and would allow users to query relevant information about to make their own evaluations of companies of their interest. The information our database holds is related to how companies fit and perform in their respective markets, allowing users to analyze companies beyond the scope of the stock price.

Changes of Final Schema

→ Modified Companies to have a growth rate attribute and removed the growth rate attribute from Industry in order to be more specific per company

Copy of Schema

```
CREATE TABLE Company(companyName CHAR(80) PRIMARY KEY, product CHAR(80), ticker CHAR(10) UNIQUE, country CHAR(80) NOT NULL, growthRate NUME
CREATE TABLE Investor(investorName CHAR(80) PRIMARY KEY, isVentureCapitalist NUMBER(1));CREATE TABLE CEO (ceoName char(80) PRIMARY KEY, age
CREATE TABLE CEO (ceoName char(80) PRIMARY KEY, age int, gender char(80), educationLevel char(80));
CREATE TABLE Industry (industryName char(80) PRIMARY KEY, averagePERatio int, averageRevenue int);
CREATE TABLE ActiveIn (companyName char(80), industryName char(80), activeSince char(80), PRIMARY KEY(companyName, industryName));
CREATE TABLE Invests (investorName char(80), companyName char(80), amountInvested int, PRIMARY KEY(investorName, companyName));
CREATE TABLE Country (countryName CHAR(80), democracyIndex INT, primaryLanguage CHAR(80) NOT NULL, PRIMARY KEY (countryName));
CREATE TABLE Language (langName CHAR(80), culture CHAR(80) NOT NULL, PRIMARY KEY (langName));
CREATE TABLE Education (educationLevel CHAR(80), netWorth INT, PRIMARY KEY (educationLevel));
CREATE TABLE Culture (cultureName CHAR(80), masculinityVsFemininity INT NOT NULL, longVsShortTerm INT NOT NULL, indulgenceVsRestraint INT,
CREATE TABLE lvStoUa (longVsShortTerm INT, uncertaintyAvoidance INT, PRIMARY KEY (longVsShortTerm));
CREATE TABLE mvfToIvcPd (masculinityVsFemininity INT, IndividualismVsCollectivism INT, powerDistance INT, PRIMARY KEY (masculinityVsFeminin
CREATE TABLE Founder (founderName CHAR(80) NOT NULL,foundingYear char(80),isSoleFounder char(5),PRIMARY KEY (founderName));
CREATE TABLE Liabilities (assets INT,liabilities_amount INT NOT NULL,PRIMARY KEY (assets));
CREATE TABLE Finances (fid INT,revenue INT NOT NULL,assets INT NOT NULL,ebtida INT,reportDate char(80),companyName CHAR(80),PRIMARY KEY(fid
CREATE TABLE Earnings (revenue INT,earnings INT,PRIMARY KEY (revenue));
CREATE TABLE Revenue (averageRevenue INT,totalRevenue INT,PRIMARY KEY (averageRevenue));
CREATE TABLE Firms (averageRevenue INT,numOfFirms INT,PRIMARY KEY (averageRevenue));
CREATE TABLE StockExchange(exchangeName CHAR(80),PRIMARY KEY (exchangeName));
CREATE TABLE AcquiredCompany(acqCompanyName CHAR(80),priceAtAqusition INT,yearAquired char(4),PRIMARY KEY (acqCompanyName));
CREATE TABLE StockInfo(stockPrice FLOAT,sharesOutstanding INT,marketCap INT,PRIMARY KEY (stockPrice));
CREATE TABLE ListedOn(exchangeName CHAR(80),companyName CHAR(80),dateListed char(80),stockPrice FLOAT,PRIMARY KEY (exchangeName, companyNam
```

ASSETS	LIABILITIES_AMOUNT
100	10000000
235	21000000
55	520000
70	700000
180	20000000

FID	REVENUE	ASSETS	EBTIDA	REPORTDATE	COMPANYNAME
100	10000000	70	11000000	12-JUL-2012	Apple
101	9000000	55	10500000	16-MAR-2017	Google
102	23000000	180	25000000	20-SEP-2007	Meta
103	22000000	100	11000000	21-NOV-2019	Amazon
104	2000000	235	2500000	11-DEC-219	Netflix

INVESTORNAME	ISVENTURECAPITALIST
Warren Buffett	False
Philip Fisher	False
Benjamin Graham	False
Bain Capital	True
GV	True

CEONAME	AGE	GENDER	EDUCATIONLEVEL
Sundar Pichai	50	MAN	Masters Degree
Tim Cook	62	MAN	Masters Degree
Satya Nadella	55	MAN	Masters Degree
Mary Barra	61	WOMAN	Masters Degree
RJ Scaringe	40	MAN	Doctorate
Bill Gates	67	MAN	False
Andrew Witty	58	MAN	Bachelors Degree
Ted Sarandos	58	MAN	Bachelors Degree
Andy Jassy	55	MAN	Masters Degree
Adam Mosseri	40	MAN	Bachelors Degree
Mark Zuckerberg	42	MAN	Masters Degree
Elon Musk	45	MAN	Masters Degree
Kiichiro Toyoda	95	MAN	Bachelors Degree
John Warnock	67	MAN	Bachelors Degree
Diane Greene	37	WOMAN	Masters Degree
Maxim Kolomeychenko	51	MAN	PHD Degree

REVENUE	EARNINGS
10000000	5000000
23000000	11000000
9000000	450000
2000000	1000000
22000000	1200000

COMPANYNAME	INDUSTRYNAME	ACTIVESINCE
Apple	Technology	01-MAR-1976
Microsoft	Technology	04-JUL-1975
Google	Technology	04-SEP-1998
Lockheed Martin Corp	Defense	01-APR-1990
United Health	Health	02-DEC-1994
Barrick Gold	Mining	22-FEB-1984
Kennedy-Wilson Holdings Inc	Real Estate	01-JUN-1971
Tesla	Automobiles	01-JUL-2003
Rivian	Automobiles	08-JUN-2009

AVERAGEREVENUE	TOTALREVENUE
20000	100000
15000	75000
8000	32000
12000	60000
9000	36000

INVESTORNAME	COMPANYNAME	AMOUNTINVESTED
Warren Buffett	Apple	2002000
Warren Buffett	Microsoft	1505000
Warren Buffett	Google	860000
Warren Buffett	Tesla	1250000
Philip Fisher	Apple	900000
Philip Fisher	Lockheed Martin Corp	220000
Philip Fisher	United Health	220000
Philip Fisher	Instagram	2003000
Benjamin Graham	Kennedy-Wilson Holdings Inc	1500000
Benjamin Graham	Rivian	1500000
Bain Capital	Tesla	2004000
Bain Capital	Barrick Gold	2004000

AVERAGEREVENUE	NUMOFFIRMS
20000	5
15000	5
8000	4
12000	5
9000	4

COUNTRYNAME	DEMOCRACYINDEX	PRIMARYLANGUAGE
USA	9	English
Canada	8	English
England	8	English
Turkey	4	Turkish
Portugal	8	Portuguese

EXCHANGENAME
Euronext
Japan Exchange Group
Nasdaq
New York Stock Exchange
Shanghai Stock Exchange

LANGNAME	CULTURE
English	Western
Turkish	Islamic
Portuguese	Roman Catholic
Spanish	Western European
Arabic	Islamic

ACQCOMPANYNAME	PRICEATAQUSITION	YEARAQUIRED
Instagram	1000	2012
Google	1650	2015

EDUCATIONLEVEL	NETWORTH
Highschool Diploma	3500000
Bachelors Degree	2500000
Masters Degree	2400000
PHD Degree	3000000
Doctorate	2000000
Apprenticeship Certificate	1500000

STOCKPRICE	SHARESOUTSTANDING	MARKETCAP
1.12	12333456	1408877771
2.82	854037536	13822370
87.82	745494	2420148299
.98	1434958316	8879417430
9.57	927538852	65409821

CULTURENAME	MASCULINITYVSFEMININITY	LONGVSSHORTTERM	INDULGENCEVSRESTRAINT
Western	62	29	83
Islamic	52	12	60
Roman Catholic	31	19	57
Western European	42	29	76
Han	66	118	39

EXCHANGENAME	COMPANYNAME	DATELISTED	STOCKPRICE
New York Stock Exchange	Apple	24-AUG-2011	1.12
New York Stock Exchange	Microsoft	04-FEB-2014	2.82
New York Stock Exchange	Google	02-OCT-2015	87.82
New York Stock Exchange	Tesla	02-OCT-2008	.98
New York Stock Exchange	Rivian	07-AUG-2009	9.57

LONGVSSHORTTERM	UNCERTAINTYAVOIDANCE
29	46
12	54
19	44
39	42
118	40

FOUNDERNAME	FOUNDINGYEAR	ISSOLEFOUNDER
Mark Zuckerberg	2004	F
Elon Musk	2002	T
Kiichiro Toyoda	1937	T
John Warnock	1982	F
Diane Greene	1998	F

MASCULINITYVSFEMININITY	INDIVIDUALISMVSCOLLECTIVISM	POWERDISTANCE
62	91	40
52	38	80
31	27	63
42	51	57
66	20	80

List of all SQL Queries used and Screenshots

Insert Operation

→ Implemented by handleMakeCEO() which can be found on in manage.php file on line 596

```
INSERT INTO CEO(ceoName, age, gender, educationLevel) VALUES('$ceo', $ceoAge, '$ceoGender', '$ceoEducation');
```

Before:

CEONAME	AGE	GENDER	EDUCATIONLEVEL
Sundar Pichai	50	MAN	Masters Degree
Tim Cook	62	MAN	Masters Degree
Satya Nadella	55	MAN	Masters Degree
Mary Barra	61	WOMAN	Masters Degree
RJ Scaringe	40	MAN	Doctorate
Bill Gates	67	MAN	False
Andrew Witty	58	MAN	Bachelors Degree

During:

Add CEO

Name: [Nafis]   Age: [20]   Gender: [Man ▾]   Education Level: [Bachelor's Degree ▾]   [Add]

After:

Inserted CEO.	✕

CEONAME	AGE	GENDER	EDUCATIONLEVEL
Nafis	20	MAN	Bachelors Degree
Sundar Pichai	50	MAN	Masters Degree
Tim Cook	62	MAN	Masters Degree
Satya Nadella	55	MAN	Masters Degree
Mary Barra	61	WOMAN	Masters Degree
RJ Scaringe	40	MAN	Doctorate
Bill Gates	67	MAN	False
Andrew Witty	58	MAN	Bachelors Degree

Delete Operation

→ Implemented by handleDeleteInvestor() which can be found on in manage.php file on line 1138.

```
DELETE FROM Investor WHERE LOWER(investorName) = '$investorName'
```

Before

INVESTORNAME	ISVENTURECAPITALIST
Warren Buffett	False
Philip Fisher	False
Benjamin Graham	False
Bain Capital	True
GV	True

Investor

During

Delete Investor

Name: GV   Delete

After

Deleted Investor.

INVESTORNAME	ISVENTURECAPITALIST
Warren Buffett	False
Philip Fisher	False
Benjamin Graham	False
Bain Capital	True

Update Operation

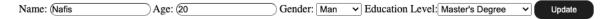→ Implemented by handleUpdateCEO() which can be found on in manage.php file on line 906.

```
UPDATE CEO SET age = $ceoAge, gender = '$ceoGender', educationLevel = '$ceoEducation' WHERE LOWER(ceoName) = '$ceo'
```

Before:

CEONAME	AGE	GENDER	EDUCATIONLEVEL
Nafis	20	MAN	Bachelors Degree
Sundar Pichai	50	MAN	Masters Degree
Tim Cook	62	MAN	Masters Degree
Satya Nadella	55	MAN	Masters Degree
Mary Barra	61	WOMAN	Masters Degree
RJ Scaringe	40	MAN	Doctorate
Bill Gates	67	MAN	False
Andrew Witty	58	MAN	Bachelors Degree

During:

Update CEO

Name: [Nafis] Age: [20] Gender: [Man ▾] Education Level: [Master's Degree ▾] [Update]

After:

Updated CEO.

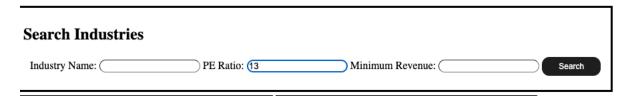| CEONAME	AGE	GENDER	EDUCATIONLEVEL
Nafis	20	MAN	Masters Degree
Sundar Pichai	50	MAN	Masters Degree
Tim Cook	62	MAN	Masters Degree
Satya Nadella	55	MAN	Masters Degree
Mary Barra	61	WOMAN	Masters Degree
RJ Scaringe	40	MAN	Doctorate
Bill Gates	67	MAN	False
Andrew Witty	58	MAN	Bachelors Degree

Selection Operation

→ Implemented by handleSearchIndustries(); can be found on in search.php file on line 101.

```
SELECT * FROM Industry WHERE LOWER(industryName) = '" . strtolower($industryName) . "'"
AND AVERAGEPERATIO = " . $peRatio .
AND AVERAGEREVENUE >= " . $revenue . "
```

Before:

INDUSTRYNAME	AVERAGEPERATIO	AVERAGEREVENUE
Mining	17	20000
Health	25	15000
Defense	13	8000
Technology	23	12000
Real Estate	10	9000
Automobiles	13	20000

During:

Search Industries

Industry Name: ( ) PE Ratio: (13) Minimum Revenue: ( ) Search

After:

INDUSTRYNAME	AVERAGEPERATIO	AVERAGEREVENUE
Defense	13	8000
Automobiles	13	20000

Projection Operation

→ Implemented by handleViewSelectedData() can be found on in manage.php file on line 1271.

```
SELECT ($attr1Name, $attr2Name, ...) FROM '$tableName$'
```

Before:

View Data

Table: [⌄] [Select]

During:

View Data

Table: [Company   ⌄] [Select]

COMPANYNAME ☑ PRODUCT ☑ TICKER ☑ COUNTRY ☐ GROWTHRATE ☑ CEO ☑ CEODATESTARTED ☐ [Select]

After:

View Data

Table: [⌄] **Select**

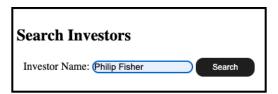| COMPANYNAME	PRODUCT	TICKER	GROWTHRATE	CEO
Apple	Technological Hardware	AAPL	.15	Tim Cook
Microsoft	Technological Software	MSFT	.12	Satya Nadella
Google	Technological Software	GOOGL	.16	Sundar Pichai
Meta	Technological Software	META	.12	Mark Zuckerberg
Amazon	E-commerce	AMZN	.18	Andy Jassy
Netflix	Streaming Service	NFLX	.14	Ted Sarandos
Tesla	Automobiles	TSLA	.1	Elon Musk
Rivian	Automobiles	RIVN	.05	RJ Scaringe
Instagram	Social Media	FB	.14	Adam Mosseri

Join Operation

→ Implemented by handleSearchInvestors() which can be found on in search.php file on line 133.

```
SELECT I.companyName, I.amountInvested, C.country, A.industryName
FROM Invests I, Company C, ActiveIn A
WHERE I.companyName = C.companyName AND C.companyName = A.companyName AND LOWER(investorName) = '" . strtolower($investorName) . "'"
```

Before:

INVESTORNAME
Bain Capital
Benjamin Graham
Philip Fisher
Warren Buffett

During:

After:

INVESTORNAME	ISVENTURECAPITALIST
Philip Fisher	False

COMPANYNAME	AMOUNTINVESTED	COUNTRY	INDUSTRYNAME
Apple	900000	USA	Technology
Lockheed Martin Corp	220000	USA	Defense
United Health	220000	USA	Health

Division:

Find each industry where all the companies in that industry are invested in by (an investor)

→ Implemented by handleIndustrialCommit() which can be found on in search.php file on line 198.

```
SELECT I.industryName
FROM Industry I
WHERE NOT EXISTS (SELECT companyName
                  FROM ActiveIn A
                  WHERE A.industryName = I.industryName
                  AND NOT EXISTS (
                  SELECT companyName
                  FROM Invests
                  WHERE LOWER(investorName) = 'investorName'
                  AND companyName = A.companyName))
```

Before

INDUSTRYNAME	AVERAGEPERATIO	AVERAGEREVENUE
Mining	17	20000
Health	25	15000
Defense	13	8000
Technology	23	12000
Real Estate	10	9000
Automobiles	13	20000

Industry

INVESTORNAME	COMPANYNAME	AMOUNTINVESTED
Warren Buffett	Apple	2002000
Warren Buffett	Microsoft	1505000
Warren Buffett	Google	860000
Warren Buffett	Tesla	1250000
Philip Fisher	Apple	900000
Philip Fisher	Lockheed Martin Corp	220000
Philip Fisher	United Health	220000
Philip Fisher	Instagram	2003000
Benjamin Graham	Kennedy-Wilson Holdings Inc	1500000
Benjamin Graham	Rivian	1500000
Bain Capital	Tesla	2004000
Bain Capital	Barrick Gold	2004000

Invests

COMPANYNAME	INDUSTRYNAME	ACTIVESINCE
Apple	Technology	01-MAR-1976
Microsoft	Technology	04-JUL-1975
Google	Technology	04-SEP-1998
Lockheed Martin Corp	Defense	01-APR-1990
United Health	Health	02-DEC-1994
Barrick Gold	Mining	22-FEB-1984
Kennedy-Wilson Holdings Inc	Real Estate	01-JUN-1971
Tesla	Automobiles	01-JUL-2003
Rivian	Automobiles	08-JUN-2009

ActiveIn

During

After

INDUSTRYNAME
Defense
Health

Nested Aggregation with Group By

Find the industries with above average growth rate, that a specific investor has invested in. Return industry name and its growth rate

→ Implemented by handleSearchAboveAverage() which can be found on in search.php file on line 160.

```
SELECT Temp.industryName indName, Temp.growthRate avgGR
FROM ( SELECT A.industryName, AVG(C.growthRate) as growthRate
        FROM Invests Inv, Company C, ActiveIn A
        WHERE C.companyName = Inv.companyName AND A.companyName = C.companyName
        AND LOWER(Inv.investorName) = 'investorName'
        GROUP BY A.industryName ) Temp
WHERE Temp.growthRate > (SELECT AVG(growthRate) FROM Company)
```

Before

INVESTORNAME	COMPANYNAME	AMOUNTINVESTED
Warren Buffett	Apple	2002000
Warren Buffett	Microsoft	1505000
Warren Buffett	Google	860000
Warren Buffett	Tesla	1250000
Philip Fisher	Apple	900000
Philip Fisher	Lockheed Martin Corp	220000
Philip Fisher	United Health	220000
Philip Fisher	Instagram	2003000
Benjamin Graham	Kennedy-Wilson Holdings Inc	1500000
Benjamin Graham	Rivian	1500000
Bain Capital	Tesla	2004000
Bain Capital	Barrick Gold	2004000

Invests

COMPANYNAME	PRODUCT	TICKER	COUNTRY	GROWTHRATE	CEO	CEODATESTARTED
Apple	Technological Hardware	AAPL	USA	.15	Tim Cook	24-AUG-2011
Microsoft	Technological Software	MSFT	USA	.12	Satya Nadella	04-FEB-2014
Google	Technological Software	GOOGL	USA	.16	Sundar Pichai	02-OCT-2015
Meta	Technological Software	META	USA	.12	Mark Zuckerberg	01-JUL-2004
Amazon	E-commerce	AMZN	USA	.18	Andy Jassy	05-JUL-2021
Netflix	Streaming Service	NFLX	USA	.14	Ted Sarandos	14-JUL-2020
Tesla	Automobiles	TSLA	USA	.1	Elon Musk	02-OCT-2008
Rivian	Automobiles	RIVN	USA	.05	RJ Scaringe	07-AUG-2009
Instagram	Social Media	FB	USA	.14	Adam Mosseri	01-OCT-2018
Lockheed Martin Corp	Aerospace	LMT	USA	.18	James Taiclet	15-JUN-2020
United Health	Insurance	UNH	USA	.14	Andrew Witty	03-FEB-2021
Barrick Gold	Gold	ABX	Canada	.19	Mark Bristow	01-JAN-2019
Kennedy-Wilson Holdings Inc	Investment	KW	USA	.19	William McMorrow	09-APR-1998

Company

COMPANYNAME	INDUSTRYNAME	ACTIVESINCE
Apple	Technology	01-MAR-1976
Microsoft	Technology	04-JUL-1975
Google	Technology	04-SEP-1998
Lockheed Martin Corp	Defense	01-APR-1990
United Health	Health	02-DEC-1994
Barrick Gold	Mining	22-FEB-1984
Kennedy-Wilson Holdings Inc	Real Estate	01-JUN-1971
Tesla	Automobiles	01-JUL-2003
Rivian	Automobiles	08-JUN-2009

ActiveIn

During

Find Above Average Industries Per Investor

Investor Name: Benjamin Graham   Search

After

INVNAME	INDNAME	AVGGR
Benjamin Graham	Real Estate	.19

Aggregation with Having

Find the age of the youngest CEO of each of the education levels where multiple people have each degree (that is, bachelors, masters or phd).

→ Implemented by handleSearchCEOs() which can be found on in search.php file on line 174.

```
SELECT min(age) age, educationLevel
FROM CEO
WHERE gender = 'gender'
GROUP BY educationLevel
HAVING count(*) > 1
```

Before

CEONAME	AGE	GENDER	EDUCATIONLEVEL
Sundar Pichai	50	MAN	Masters Degree
Tim Cook	62	MAN	Masters Degree
Satya Nadella	55	MAN	Masters Degree
Mary Barra	61	WOMAN	Masters Degree
RJ Scaringe	40	MAN	Doctorate
Bill Gates	67	MAN	False
Andrew Witty	58	MAN	Bachelors Degree
Ted Sarandos	58	MAN	Bachelors Degree
Andy Jassy	55	MAN	Masters Degree
Adam Mosseri	40	MAN	Bachelors Degree
Mark Zuckerberg	42	MAN	Masters Degree
Elon Musk	45	MAN	Masters Degree
Kiichiro Toyoda	95	MAN	Bachelors Degree
John Warnock	67	MAN	Bachelors Degree
Diane Greene	37	WOMAN	Masters Degree
Maxim Kolomeychenko	51	MAN	PHD Degree
Guido Sacchi	60	MAN	PHD Degree
Long Phan	52	MAN	PHD Degree

During

Search For The Youngest CEOs By Gender Per Degree

Gender: [Man ▾] [Search]

After

AGE	EDUCATIONLEVEL
40	Bachelors Degree
45	PHD Degree
42	Masters Degree

Aggregation With Group By

Display the total amount invested into each industry by an investor.

→ Implemented by handleTotalInvested() which can be found on in search.php file on line 186.

```
SELECT sum(amountInvested) amount, industryName
FROM Invests I, ActiveIn AI
WHERE LOWER(investorName) = 'investorName'
AND AI.companyName = I.companyName
GROUP BY AI.industryName
```

Before

INVESTORNAME	COMPANYNAME	AMOUNTINVESTED
Warren Buffett	Apple	2002000
Warren Buffett	Microsoft	1505000
Warren Buffett	Google	860000
Warren Buffett	Tesla	1250000
Philip Fisher	Apple	900000
Philip Fisher	Lockheed Martin Corp	220000
Philip Fisher	United Health	220000
Philip Fisher	Instagram	2003000
Benjamin Graham	Kennedy-Wilson Holdings Inc	1500000
Benjamin Graham	Rivian	1500000
Bain Capital	Tesla	2004000
Bain Capital	Barrick Gold	2004000

Invests

COMPANYNAME	INDUSTRYNAME	ACTIVESINCE
Apple	Technology	01-MAR-1976
Microsoft	Technology	04-JUL-1975
Google	Technology	04-SEP-1998
Lockheed Martin Corp	Defense	01-APR-1990
United Health	Health	02-DEC-1994
Barrick Gold	Mining	22-FEB-1984
Kennedy-Wilson Holdings Inc	Real Estate	01-JUN-1971
Tesla	Automobiles	01-JUL-2003
Rivian	Automobiles	08-JUN-2009

ActiveIn

During

View Total Amount Invested In Industries Per Investor

Investor Name: Warren Buffett   Search

After

AMOUNT	INDUSTRYNAME
4367000	Technology
1250000	Automobiles