Project Requirement

Beat Me

CS 157A - TEAM 1
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CS 157A - [Section 01]

1. Project Overview

1.1. Background

- The number of e-commerce shoppers is growing every year. Often, they have a difficult time to find the best price for what they are looking for. For example, on Amazon Prime Day, because lots of products are on sale at the same time, the shopper may have a hard time to figure out which products provide the best price. Also, the cost of the product is continually changing, and the list of the item looks very similar.

1.2 Customer or Market Needs

- According to *Figure 1.* by Statista, the number of e-commerce shoppers in the United States is growing. Therefore, the online deal tracker would help them to find the best price for the product. Currently, there is a website called *CamelCamelCamel,* which allows the online shopper to keep track of the item price, yet it is only for Amazon. *Beat Me* keeps track of the item price over verified online retailers so that the shopper is more likely to find the best price for the specific item.

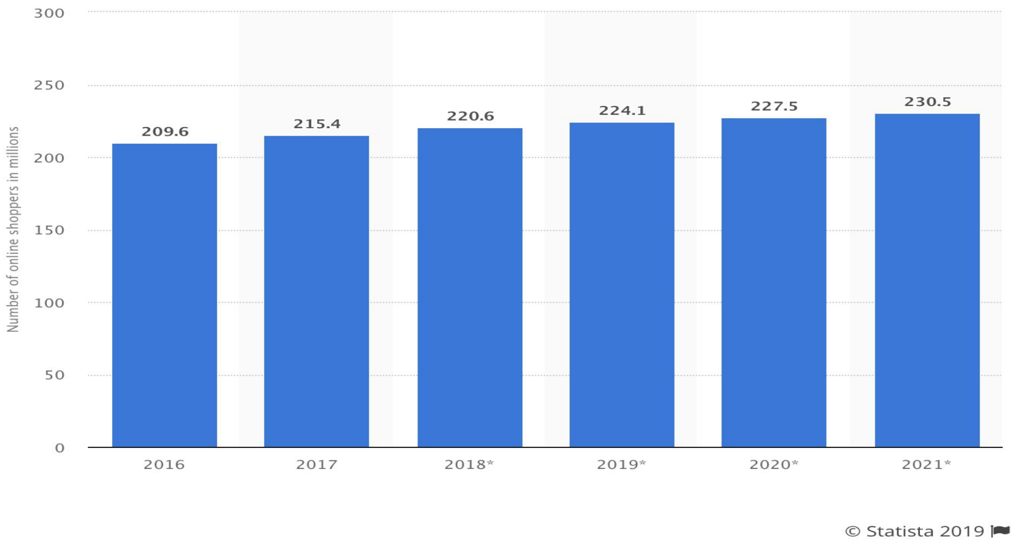


Figure 1. Number of digital shoppers in the United States from 2016 to 2021 (in millions)

1.3 Stakeholder Profile

1.3.1 Clients

- Anyone can use *Beat Me* to find the best price on the online retailer's website. *Beat Me* will guarantee the user's convenience because *Beat Me* will notify the user when the price cheaper than usual so that the user does not need to keep checking the price of the product.

1.3.2 Investors

- The small online retailer could have more benefits than big online retailers such as Amazon or eBay because Beat Me will provide advertising effects.

2. System Environment

2.1 A Structure Diagram of The System

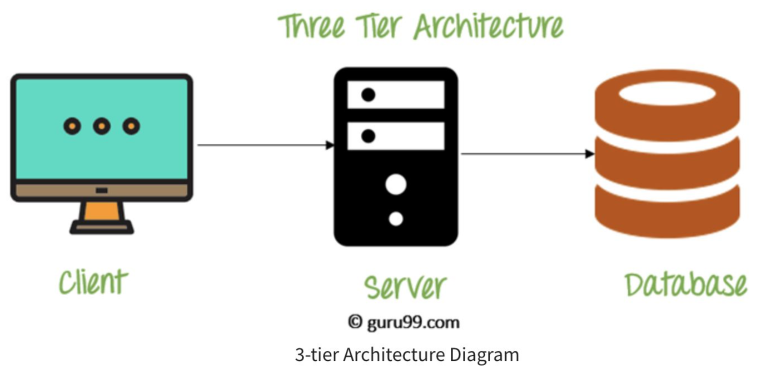


Figure 2. 3-Tier Architecture

2.2 System Requirement

- Front-end(Client): React JS, HTML, CSS, Javascript
- Back-end: Flask, Python
- Server: Apache
- Database (RDBMS - Database): MySQL 8.0
- Software: Git, Github, Taiga, Google Drive.

3. Functional requirement

3.1 Performance

- To using a Smartphone or PC, the client can access the *Beat Me* website and perform price tracking on certain products.

3.2 Functionality/Features

- Supports popular retail sites such as Amazon, Bestbuy, Walmart, etc by using their provided API or web crawling.
- Allow users to track the price of a specific product on a supported retailer site.
- Notifies users through email when the price of a product drops below the user's desired price.

Specific Functions:

User registration

- The user shall be able to register an account with a username, email, and password
- The system will validate the user's input and check for conflicts in the database before adding the user

User login

- The user shall be able to log in to his/her account with the correct username/email and password combination
- The system will confirm the user's credential stored in the database before granting access to the user's product tracking page

Update user information

- The user shall be able to update their email for receiving notification
- The system will update the email address of the user in the database

Update login password

- The user shall be able to update their login password by providing their current password

Adding product for tracking

- The user shall be able to paste the link of the product page (e.g., Amazon) and set the desired price that they are willing to pay.
- The system will add the product link to the database as well as any related items.

Updating the desired price of the currently tracked product

- The user shall be able to update the wanted price of particular merchandise.
- The system updates the latest desired price of the product associated with the user in the database.

Removing a product for tracking

- The user shall be able to remove a tracking product on their list.
- The system removes the association between the user and the product, but will not remove the product from the database.

Browsing tracked products

- The user should be able to browser all the products they've tracked, displaying their current price and the desired price, as well as links to the actual product.
- The system will fetch all the product information that the user is tracking from the database and display it for the user.

Order products

- The user shall be able to order the products by name, current price, or price difference.
- The system will sort the user-specified criteria and display it for the user.

Announcement

- The admin user can post important announcements with messages and time.
- The user will see the announcement on the main page.

TokenBlacklist

- The system store the user token to handle the login system.
- When the user logout, the token will expire and store it into the TokenBlakclist database table.

Administration

- The admin user can register with id and password
- The admin account has more accessibility to the website than the normal user.

Comment

- Each user can leave comments on product's description pages.
- Once the user leaves the comment, any users can see the comment.

4. Non-Functional issues

4.1 Security

- The user account will be password protected.
- The user’s login information will be stored as hashed and salted in the database. This prevents the user’s credentials from being used in case the database is breached.
- *Beat Me* website will implement with the SQL injection prevention method.

Access Control

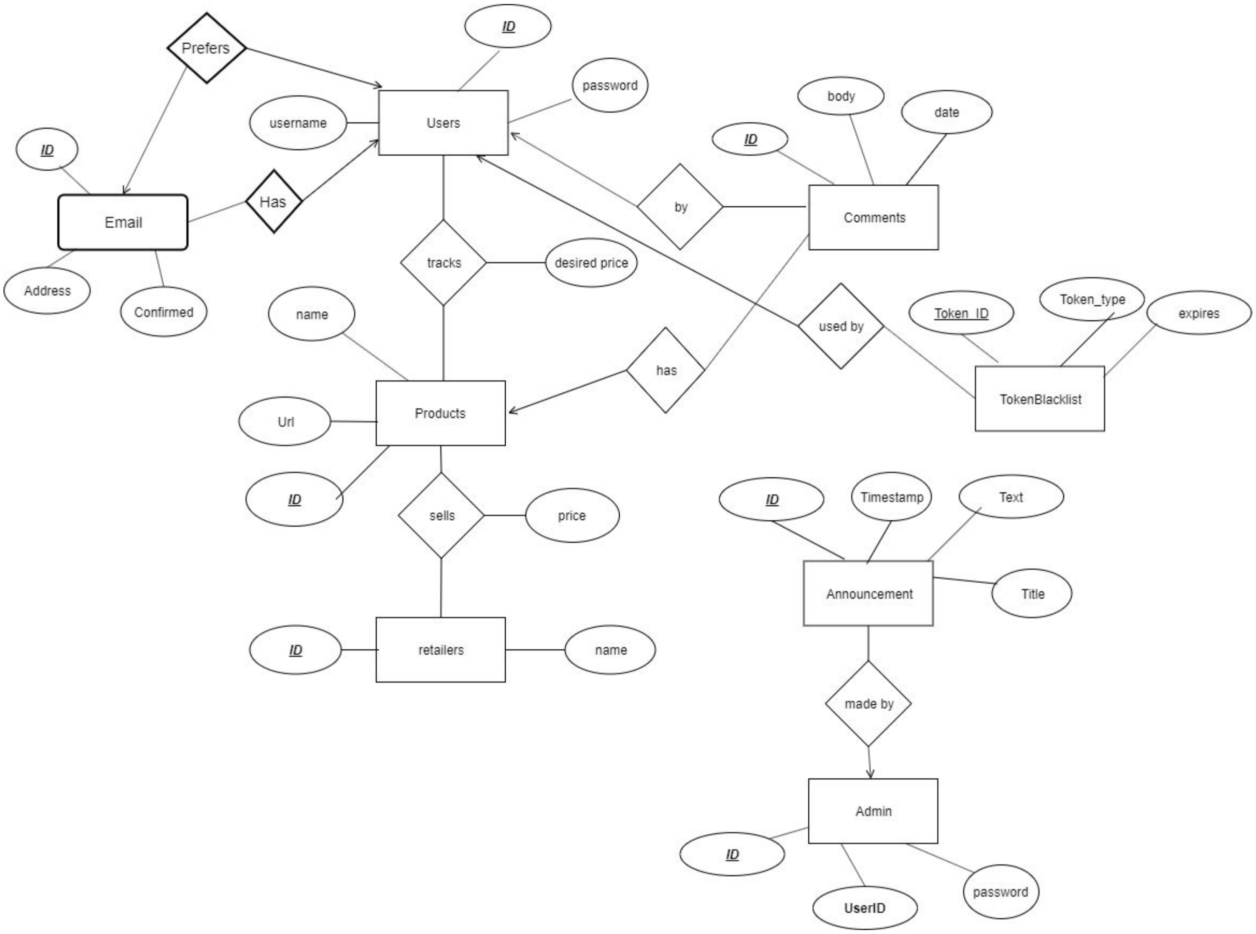
- A user will only be able to see and update his/or her product tracking list associated with their account.

Graphical User Interface (GUI)

- Our GUI will aim to maximize the ease of use for the user. The user will be able to see the list of products they are tracking. It describes as columns of name, current price, desired price, and the price difference of the present and wanted price.
- The user can sort the list based on each of the columns in ascending or descending order. We will also have a field at the top of the page to enter/paste in a new product link, which will then prompt the user to enter the desired price for the product. We will have a few pre-calculated values based on the current product price allowing

ease of setting the desired price, for example, 10%, 20%, 50% off the current price.

5. E/R Diagram

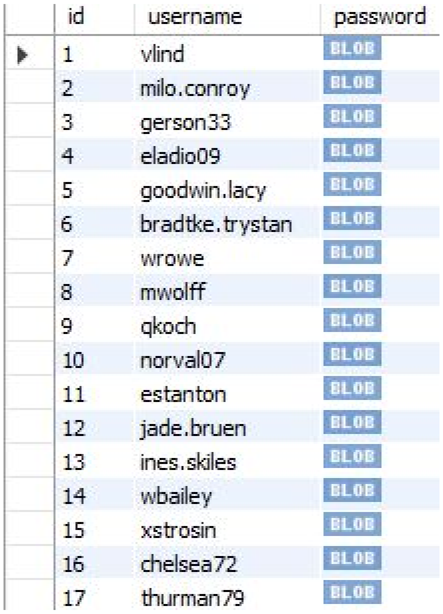

Prefers
ID
password
username
Users
body
date
ID
ID
Email
Has
by
Comments
tracks
desired price
Address
Confirmed
name
used by
Token_ID
Token_type
expires
has
Products
Url
TokenBlacklist
ID
sells
price
ID
Timestamp
Text
Announcement
Title
ID
retailers
name
made by
Admin
ID
UserID
password

5.1 Database Schema

- user(id, username, password)
- email(id, address, confirmed, user_id)
- user_primary_email(user_id, email_id)
- product(id, name, url)
- product_tracked_by_user(product_id, user_id, desired price)
- retailer(id, name)
- product_sold_by_retailer(product_id, retailer_id, price)
- comment(id, date, body, user_id, product_id)
- announcement(id, time, title, text, admin_id)
- token_blacklist(tokenId, Token_type, expires, user_id)
- admin(id, admin_login, password)

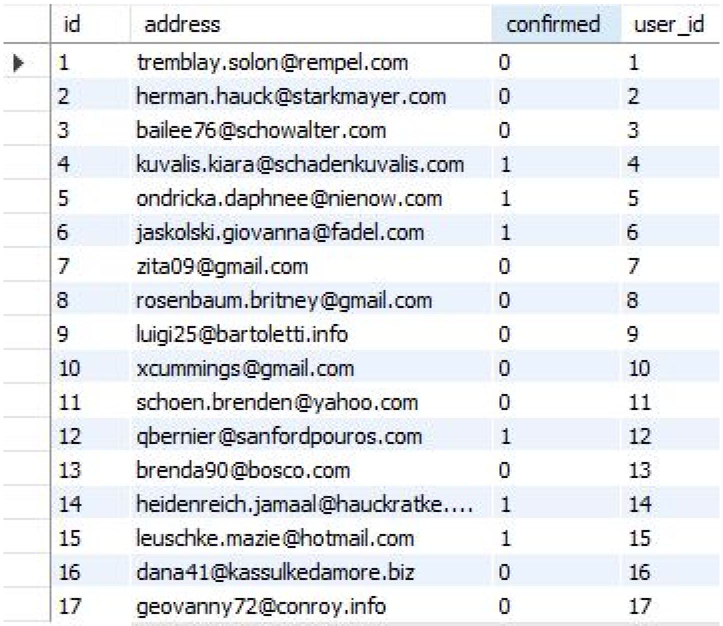
5.2 Database Description & Screenshot

- **User**: user table stores all users that has registered with the system with id, username, and password



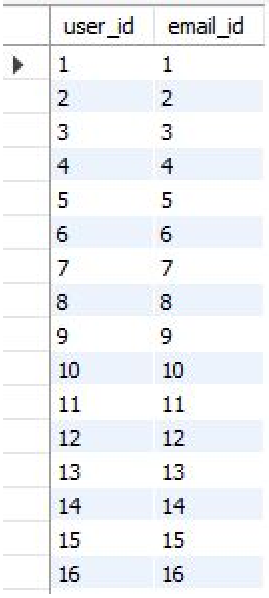
	id	username	password
▶	1	vlind	BLOB
	2	milo.conroy	BLOB
	3	gerson33	BLOB
	4	eladio09	BLOB
	5	goodwin.lacy	BLOB
	6	bradtke.trystan	BLOB
	7	wrowe	BLOB
	8	mwolff	BLOB
	9	qkoch	BLOB
	10	norval07	BLOB
	11	estanton	BLOB
	12	jade.bruen	BLOB
	13	ines.skiles	BLOB
	14	wbailey	BLOB
	15	xstrosin	BLOB
	16	chelsea72	BLOB
	17	thurman79	BLOB

- **Email** email table stores all the email registered in the system and relates many-to-one to the user table



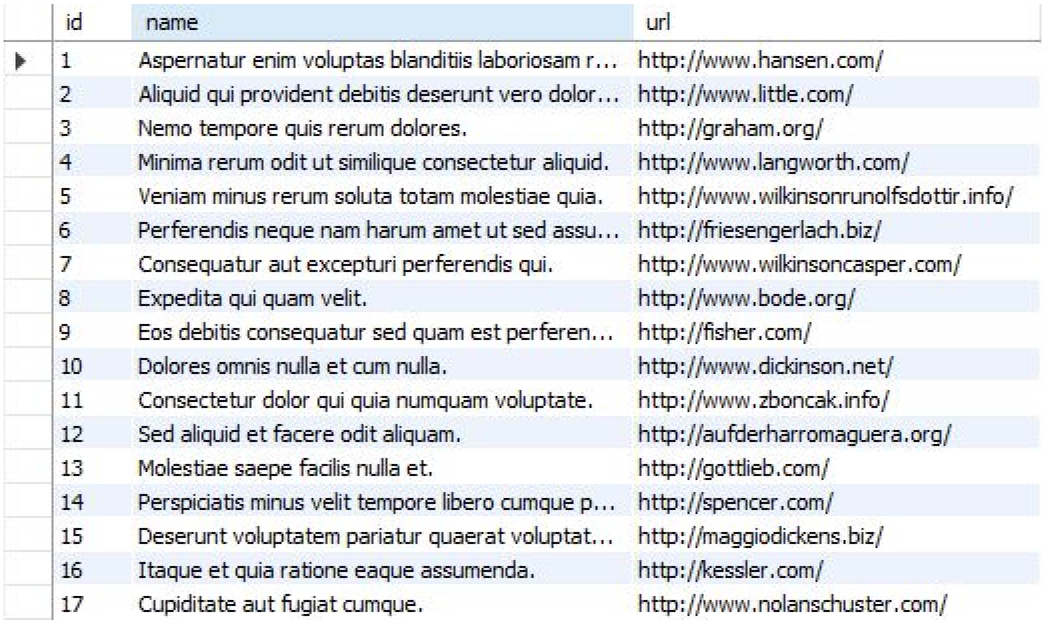
id	address	confirmed	user_id
1	tremblay.solon@rempel.com	0	1
2	herman.hauck@starkmayer.com	0	2
3	bailee76@schowalter.com	0	3
4	kuvalis.kiara@schadenkuvalis.com	1	4
5	ondricka.daphnee@nienow.com	1	5
6	jaskolski.giovanna@fadel.com	1	6
7	zita09@gmail.com	0	7
8	rosenbaum.britney@gmail.com	0	8
9	luigi25@bartoletti.info	0	9
10	xcummings@gmail.com	0	10
11	schoen.brenden@yahoo.com	0	11
12	qbernier@sanfordpouros.com	1	12
13	brenda90@bosco.com	0	13
14	heidenreich.jamaal@hauckratke....	1	14
15	leuschke.mazie@hotmail.com	1	15
16	dana41@kassulkedamore.biz	0	16
17	geovanny72@conroy.info	0	17

- **User_primary_email:** stores the primary email that the user has set, relates email and user table



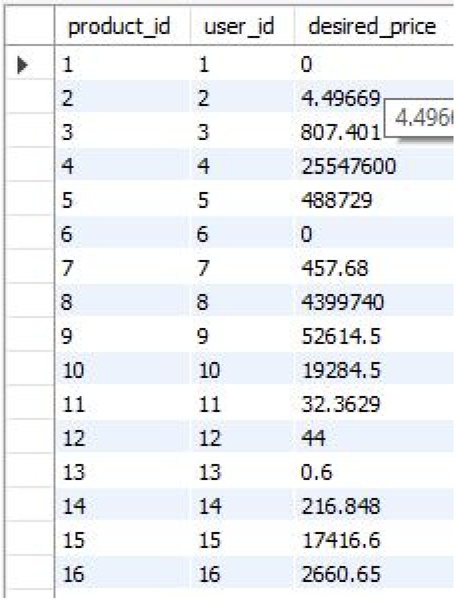
user_id	email_id
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16

- **Product**: stores products that have been added to track in the system so far, product can be tracked by multiple users with different desired price



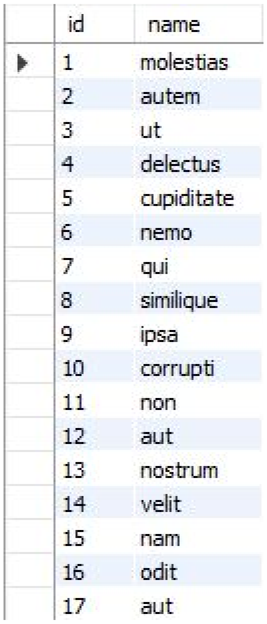
id	name	url
1	Aspernatur enim voluptas blanditiis laboriosam r…	http://www.hansen.com/
2	Aliquid qui provident debitis deserunt vero dolor…	http://www.little.com/
3	Nemo tempore quis rerum dolores.	http://graham.org/
4	Minima rerum odit ut similique consectetur aliquid.	http://www.langworth.com/
5	Veniam minus rerum soluta totam molestiae quia.	http://www.wilkinsonrunolfsdottir.info/
6	Perferendis neque nam harum amet ut sed assu…	http://friesengerlach.biz/
7	Consequatur aut excepturi perferendis qui.	http://www.wilkinsoncasper.com/
8	Expedita qui quam velit.	http://www.bode.org/
9	Eos debitis consequatur sed quam est perferen…	http://fisher.com/
10	Dolores omnis nulla et cum nulla.	http://www.dickinson.net/
11	Consectetur dolor qui quia numquam voluptate.	http://www.zboncak.info/
12	Sed aliquid et facere odit aliquam.	http://aufderharromaguera.org/
13	Molestiae saepe facilis nulla et.	http://gottlieb.com/
14	Perspiciatis minus velit tempore libero cumque p…	http://spencer.com/
15	Deserunt voluptatem pariatur quaerat voluptat…	http://maggiodickens.biz/
16	Itaque et quia ratione eaque assumenda.	http://kessler.com/
17	Cupiditate aut fugiat cumque.	http://www.nolanschuster.com/

- **Product_tracked_by_user**: store information about which product is tracked by which user and at what desired price



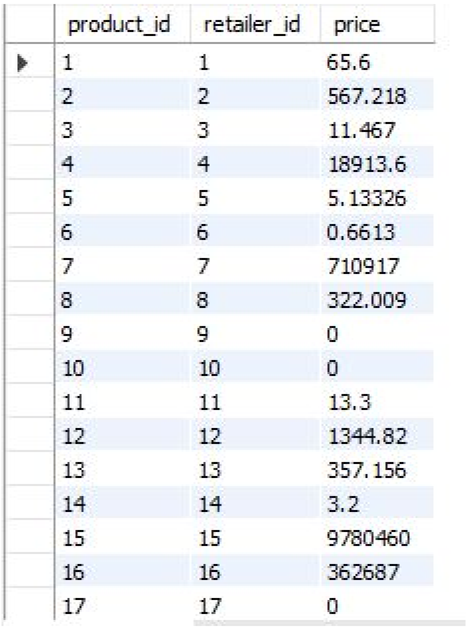
product_id	user_id	desired_price
1	1	0
2	2	4.49669
3	3	807.401
4	4	25547600
5	5	488729
6	6	0
7	7	457.68
8	8	4399740
9	9	52614.5
10	10	19284.5
11	11	32.3629
12	12	44
13	13	0.6
14	14	216.848
15	15	17416.6
16	16	2660.65

- **Retailer:** store the retailer that sells product in the product table



	id	name
▶	1	molestias
	2	autem
	3	ut
	4	delectus
	5	cupiditate
	6	nemo
	7	qui
	8	similique
	9	ipsa
	10	corrupti
	11	non
	12	aut
	13	nostrum
	14	velit
	15	nam
	16	odit
	17	aut

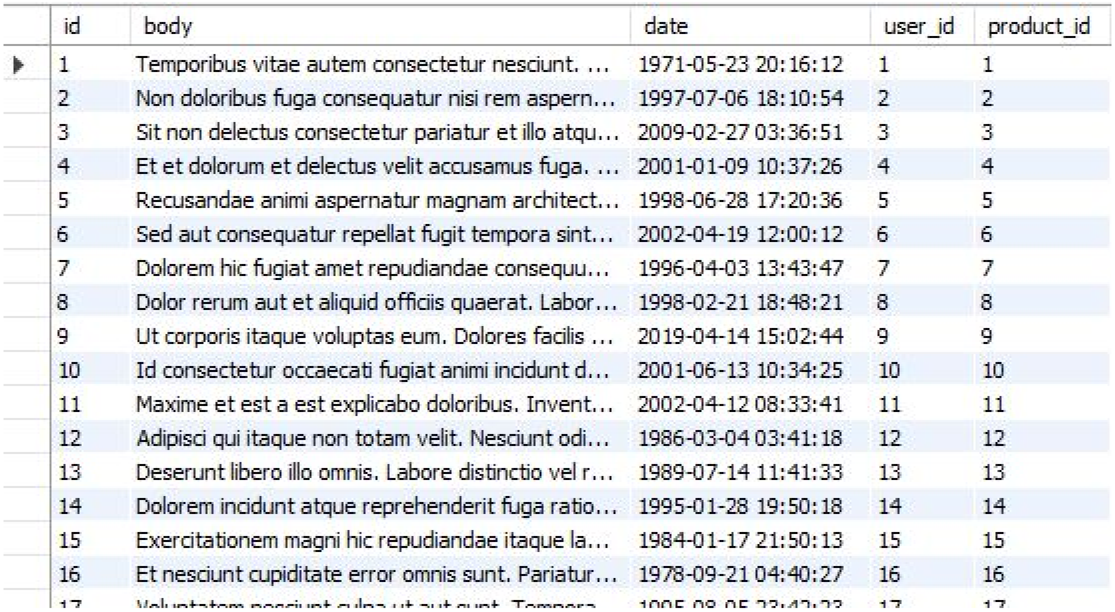
- **Product_sold_by_retailer**: store information about which product is sold by which retailer and at what price



	product_id	retailer_id	price
▶	1	1	65.6
	2	2	567.218
	3	3	11.467
	4	4	18913.6
	5	5	5.13326
	6	6	0.6613
	7	7	710917
	8	8	322.009
	9	9	0
	10	10	0
	11	11	13.3
	12	12	1344.82
	13	13	357.156
	14	14	3.2
	15	15	9780460
	16	16	362687
	17	17	0

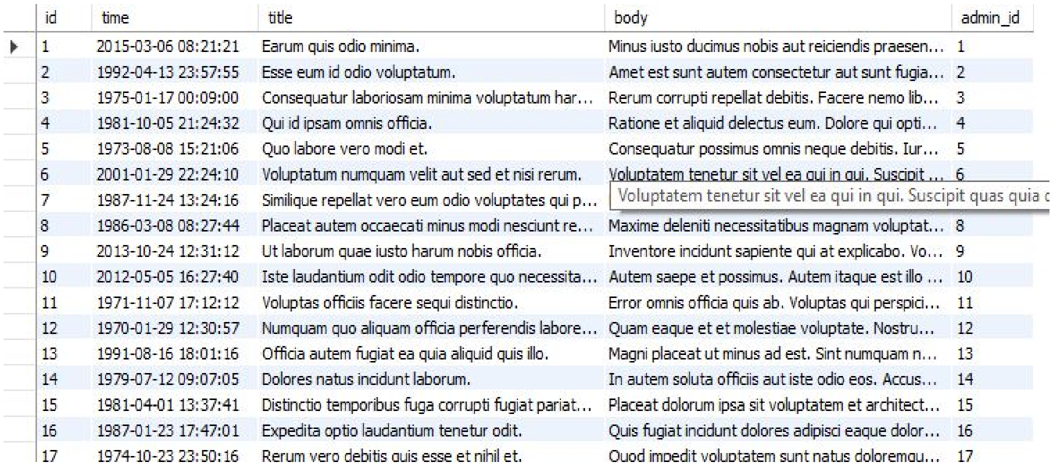
-

- **Comment:** comment table relates to user and product where each user can make multiple comments on one or more product and each product can have multiple comments by one or more users



id	body	date	user_id	product_id
1	Temporibus vitae autem consectetur nesciunt. ...	1971-05-23 20:16:12	1	1
2	Non doloribus fuga consequatur nisi rem aspern...	1997-07-06 18:10:54	2	2
3	Sit non delectus consectetur pariatur et illo atqu...	2009-02-27 03:36:51	3	3
4	Et et dolorum et delectus velit accusamus fuga. ...	2001-01-09 10:37:26	4	4
5	Recusandae animi aspernatur magnam architect...	1998-06-28 17:20:36	5	5
6	Sed aut consequatur repellat fugit tempora sint...	2002-04-19 12:00:12	6	6
7	Dolorem hic fugiat amet repudiandae consequu...	1996-04-03 13:43:47	7	7
8	Dolor rerum aut et aliquid officiis quaerat. Labor...	1998-02-21 18:48:21	8	8
9	Ut corporis itaque voluptas eum. Dolores facilis ...	2019-04-14 15:02:44	9	9
10	Id consectetur occaecati fugiat animi incidunt d...	2001-06-13 10:34:25	10	10
11	Maxime et est a est explicabo doloribus. Invent...	2002-04-12 08:33:41	11	11
12	Adipisci qui itaque non totam velit. Nesciunt odi...	1986-03-04 03:41:18	12	12
13	Deserunt libero illo omnis. Labore distinctio vel r...	1989-07-14 11:41:33	13	13
14	Dolorem incidunt atque reprehenderit fuga ratio...	1995-01-28 19:50:18	14	14
15	Exercitationem magni hic repudiandae itaque la...	1984-01-17 21:50:13	15	15
16	Et nesciunt cupiditate error omnis sunt. Pariatur...	1978-09-21 04:40:27	16	16
17	Voluptatem nesciunt culpa ut aut sunt. Tempora...	1995-08-05 23:42:23	17	17

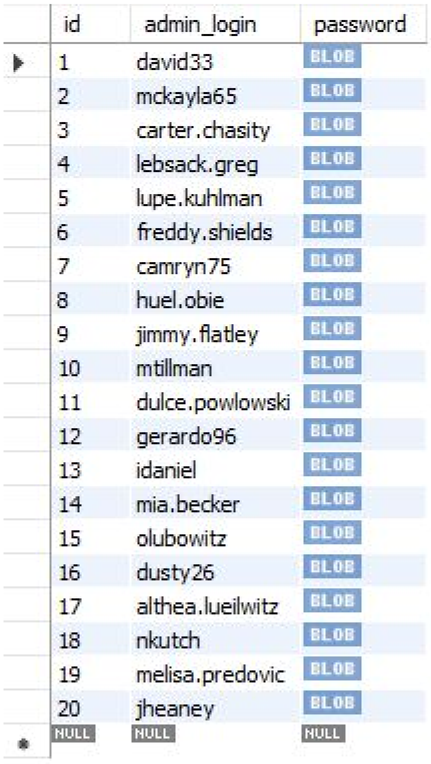
- **Announcement:** This table stores title, body text, and the current time. It identified with id. Announcement table has a relationship with admin table. The registered admin user can make announcements.



id	time	title	body	admin_id
1	2015-03-06 08:21:21	Earum quis odio minima.	Minus iusto ducimus nobis aut reiciendis praesen...	1
2	1992-04-13 23:57:55	Esse eum id odio voluptatum.	Amet est sunt autem consectetur aut sunt fugia...	2
3	1975-01-17 00:09:00	Consequatur laboriosam minima voluptatum har...	Rerum corrupti repellat debitis. Facere nemo lib...	3
4	1981-10-05 21:24:32	Qui id ipsam omnis officia.	Ratione et aliquid delectus eum. Dolore qui opti...	4
5	1973-08-08 15:21:06	Quo labore vero modi et.	Consequatur possimus omnis neque debitis. Iur...	5
6	2001-01-29 22:24:10	Voluptatum numquam velit aut sed et nisi rerum.	Voluptatem tenetur sit vel ea qui in qui. Suscipit ...	6
7	1987-11-24 13:24:16	Similique repellat vero eum odio voluptates qui p...		
8	1986-03-08 08:27:44	Placeat autem occaecati minus modi nesciunt re...	Maxime deleniti necessitatibus magnam voluptat...	8
9	2013-10-24 12:31:12	Ut laborum quae iusto harum nobis officia.	Inventore incidunt sapiente qui at explicabo. Vo...	9
10	2012-05-05 16:27:40	Iste laudantium odit odio tempore quo necessita...	Autem saepe et possimus. Autem itaque est illo ...	10
11	1971-11-07 17:12:12	Voluptas officiis facere sequi distinctio.	Error omnis officia quis ab. Voluptas qui perspici...	11
12	1970-01-29 12:30:57	Numquam quo aliquam officia perferendis labore...	Quam eaque et et molestiae voluptate. Nostru...	12
13	1991-08-16 18:01:16	Officia autem fugiat ea quia aliquid quis illo.	Magni placeat ut minus ad est. Sint numquam n...	13
14	1979-07-12 09:07:05	Dolores natus incidunt laborum.	In autem soluta officiis aut iste odio eos. Accus...	14
15	1981-04-01 13:37:41	Distinctio temporibus fuga corrupti fugiat pariat...	Placeat dolorum ipsa sit voluptatem et architect...	15
16	1987-01-23 17:47:01	Expedita optio laudantium tenetur odit.	Quis fugiat incidunt dolores adipisci eaque dolor...	16
17	1974-10-23 23:50:16	Rerum vero debitis quis esse et nihil et.	Quod impedit voluptatem sunt natus doloremqu...	17

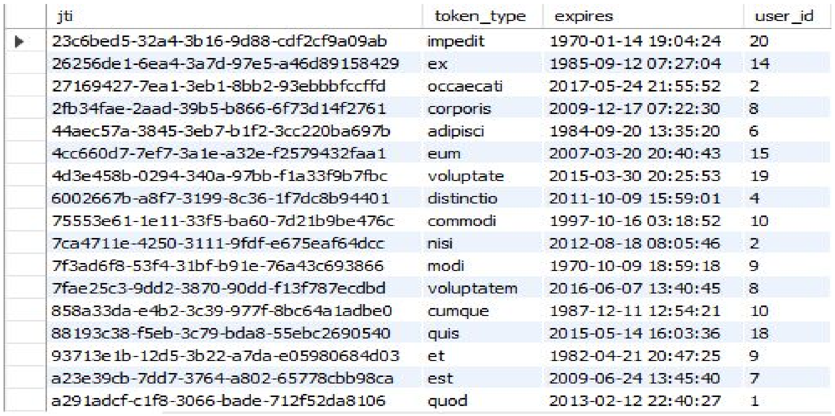
Voluptatem tenetur sit vel ea qui in qui. Suscipit quas quia c

- **Admin:** store admin that can update announcements on the website



id	admin_login	password
1	david33	BLOB
2	mckayla65	BLOB
3	carter.chasity	BLOB
4	lebsack.greg	BLOB
5	lupe.kuhlman	BLOB
6	freddy.shields	BLOB
7	camryn75	BLOB
8	huel.obie	BLOB
9	jimmy.flatley	BLOB
10	mtillman	BLOB
11	dulce.powlowski	BLOB
12	gerardo96	BLOB
13	idaniel	BLOB
14	mia.becker	BLOB
15	olubowitz	BLOB
16	dusty26	BLOB
17	althea.lueilwitz	BLOB
18	nkutch	BLOB
19	melisa.predovic	BLOB
20	jheaney	BLOB
NULL	NULL	NULL

- **Token_blackList:** TokenBlackList table store token identification, type, and expiration date when a user logs out so it can't be used again. Each token belongs to one user in the user table



jti	token_type	expires	user_id
23c6bed5-32a4-3b16-9d88-cdf2cf9a09ab	impedit	1970-01-14 19:04:24	20
26256de1-6ea4-3a7d-97e5-a46d89158429	ex	1985-09-12 07:27:04	14
27169427-7ea1-3eb1-8bb2-93ebbbfccffd	occaecati	2017-05-24 21:55:52	2
2fb34fae-2aad-39b5-b866-6f73d14f2761	corporis	2009-12-17 07:22:30	8
44aec57a-3845-3eb7-b1f2-3cc220ba697b	adipisci	1984-09-20 13:35:20	6
4cc660d7-7ef7-3a1e-a32e-f2579432faa1	eum	2007-03-20 20:40:43	15
4d3e458b-0294-340a-97bb-f1a33f9b7fbc	voluptate	2015-03-30 20:25:53	19
6002667b-a8f7-3199-8c36-1f7dc8b94401	distinctio	2011-10-09 15:59:01	4
75553e61-1e11-33f5-ba60-7d21b9be476c	commodi	1997-10-16 03:18:52	10
7ca4711e-4250-3111-9fdf-e675eaf64dcc	nisi	2012-08-18 08:05:46	2
7f3ad6f8-53f4-31bf-b91e-76a43c693866	modi	1970-10-09 18:59:18	9
7fae25c3-9dd2-3870-90dd-f13f787ecdbd	voluptatem	2016-06-07 13:40:45	8
858a33da-e4b2-3c39-977f-8bc64a1adbe0	cumque	1987-12-11 12:54:21	10
88193c38-f5eb-3c79-bda8-55ebc2690540	quis	2015-05-14 16:03:36	18
93713e1b-12d5-3b22-a7da-e05980684d03	et	1982-04-21 20:47:25	9
a23e39cb-7dd7-3764-a802-65778cbb98ca	est	2009-06-24 13:45:40	7
a291adcf-c1f8-3066-bade-712f52da8106	quod	2013-02-12 22:40:27	1

REFERENCES

DBMS Architecture: 1-Tier, 2-Tier & 3-Tier. Retrieved from https://www.guru99.com/dbms-architecture.html

Number of digital shoppers in the U.S. 2021. Retrieved from https://www.statista.com/statistics/183755/number-of-us-internet-shoppers-since-2009/