Middle East Technical University   Department of Computer Engineering

CENG 495
Cloud Computing
Spring 2024–2025
Assignment - 1

Due date: 2025-03-30 23:59

1   Introduction

For this assignment, you will develop an e-commerce Web application and deploy it to the cloud Platform-as-a-Service (PaaS) Vercel. You will use the NoSQL database MongoDB on the Database-as-a-Service (DBaaS) cloud platform MongoDB Atlas.

2   MongoDB Platform: Atlas

- Create a free account on MongoDB Atlas `https://www.mongodb.com/atlas/database`.
- Create a new project and deploy a new database, you can follow their documentation.
- Configure your database to be accessible from any IP address (from `Network Access`), and setup password authorization for DB access (from `Database Access`).
- Atlas allows fine-grained database access controls under the Security section, you can leverage this for your admin user and regular users.

3   PaaS: Vercel

- Sign up to Vercel or use your existing account.
- Go over the documentation, select the technology stack you will use to implement this assignment. I recommend you to stick to something you have used before, maybe during your part-time job or your internship. You are not restricted in the language or the stack you choose.
- While reading the documentation, you might see that Vercel expects a GitHub repo to pull and deploy your application from. You can use a private repo until the deadline (and the late submission days), after which you can make your assignment repository public if you'd like, without any issues from CENG495's part.

4 E-Commerce Application

When it comes to e-commerce, I'm sure there are some websites that come to your mind, ones that maybe you use regularly to buy groceries, clothing or appliances. Still, if you would like to draw inspiration for your design, sites that use the Shopify platform are common. If you would like to draw architectural inspirations instead, this example can be a good start. In any case, the functionalities we expect from your application are *much less* compared to real e-commerce websites or the example provided.

You are expected to develop an e-commerce application that has the following pages and functionalities;

4.1 Home Page

This is the start page of your application, it is accessed through `index.html`. The items available for sale should be listed on the homepage with filtering options for the category of the items. For the purposes of this homework, *at minimum*, the following categories of items should be for sale;

- Vinyls
- Antique Furniture
- GPS Sport Watches
- Running Shoes

If the current user is not authorized, they are only allowed to browse the items. You should offer a way for user authentication on your home page.

4.2 Admin Capabilities

When someone logs in as the admin user, they should be able to do the following;

Add Item Create & insert a new item into the database, see 4.4 for the required attributes of items.

Remove Item Remove the item from the application, also deleting ratings and reviews of the item. Any user effected by this removal should have their relevant fields updated as well.

Add User Create a new user, refer to 4.5 for user attributes.

Remove User Remove the user and update relevant items that are effected by this change.

4.3 Regular User Capabilities

When a user logs in, they should be able to do the following on each item's page;

Rate Item Rates an item on a scale of 1 to 10. The average rating of the item is updated as a result. A user can rate an item multiple times, the latter overwriting the prior rating.

Review Item Allows a user to review the item. Reviews can be updated, and the newer review overwrites the older one.

4.4 Item Attributes

The following is the list of attributes for items. When implementing the item details view (either a new page or a frame), ensure that every relevant detail of the item is presented to the user. Note that not every field is required for every item.

Name The name of the item

Description The description of the item

Price The price of the item, choice of currency is left to you

Seller The seller of the item

Image The image showing the item. You do not need to implement image upload, a hyperlink to an image file on the Internet is fine

Battery Life Only relevant for GPS sport watches.

Age Only relevant for antique furniture and vinyls.

Size Only relevant for the running shoes.

Material Only relevant for antique furniture and running shoes.

Rating Average rating this item has received

Reviews List of the reviews on the item

You are free to add additional attributes as you see fit. For instance, to keep track of the average rating, you can also have a **number of reviewers**.

4.5 User Attributes

Create a dedicated page presenting the following details of the currently authenticated regular user. If the current user is not logged-in, they should not be able to see this page or the way of accessing this page.

Username The username of the user

Average Rating The average of every rating given by this user

Reviews Every review written by this user

5 Before Submission

Populate your application by adding at least 8 items and 3 users. Have your users rate and review every item at least once. Make sure at least one item from every category is available in the application.

Bear in mind that we are using NoSQL based MongoDB which uses dynamic schema. You are expected to use the flexibility it provides and, for instance, design your database with the fewest collections possible.

6 Submission

- Deploy your application to Vercel.

- Archive your application as a `.tar.gz` file named "<username>.tar.gz" (e.g. e248205.tar.gz). Your submission must include a README file that includes your design decisions and the URL of your Vercel deployment. Without a publicly accessible deployment URL I cannot test or prepare for the live demo session.

- Your README can include: how to login as a regular user and the admin user, why you chose the programming language you did, which frameworks you have chosen and why, a user guide about how to use your application, as well as other points you would like to mention.

- This is an individual assignment. While you are free & encouraged to discuss your ideas with your peers, using code that is not your own is strictly forbidden and constitutes as cheating. The overall project should be your own work. The violators will get no grade from this assignment and will be punished according to the department regulations.

7 Grading & Live Demo

We will hold live demo sessions for you to show the usability of your Web application and discuss your MongoDB usage. The structure and schedule for the live demo sessions will be announced later on our ODTUClass page.