WebDev Resources: Backend
Hello Web Devs!

With the next task we'll be venturing into the Backend of web services. We've put together yet another list of resources for you to start learning some basics before going on to your backend tasks. Additionally, you can contact your mentor for any kind of assistance.

Back-End code runs not in your browser, but on a remote server, which is a computer that could be anywhere. The job of the backend is to offer sevices that require data to be stored, processed, and delivered - like a registration form or a login. To understand how a backend works, you must learn about HTTP, which is a system of requests and responses. HTTP is how the frontend and the backend (your client computer and the server computer) communicate.

The system that routes all these requests into the backend on the server computer, is called a web server. A webserver acts like a gate on the server, controlling all the requests which are going through. Apache and NginX are examples for a webserver.

Next we need a system that can store data in an organized manner, and fetch it when the backend asks for it. This is the function of the database. A commonly used database management system is MySQL.

Finally, we have the backend itself, which is the code that actually performs what you need to do. This can be written in a whole variety of programming languages eg: NodeJS,PHP,Flask. We don't allow MVC frameworks, like Django, Ruby on Rails, or Laravel.

Some resources for backend are listed below:

https://www.digitalocean.com/community/tutorials/how-to-install-linux-apache-mysql-php-lamp-stack-ubuntu-18-04 - Tutorial on setting up Apache, PHP, and MySQL on Ubuntu. DigitalOcean tutorials are pretty good in general.
https://phptherightway.com/ - A nice PHP reference
https://www.youtube.com/watch?v=OK_JCtrrv-c - A good intro to PHP (mostly covers all the important concepts)
https://developer.mozilla.org/en-US/docs/Learn/Server-side/Express_Nodejs - Express/Node tutorial from MDN
https://youtu.be/9FBDda0NCwo - A video series on Flask for backend
Once we start working with backend, your mentors can recommend more resources based on what you need.

Task 1: Forty Shades of Gray

Problem Statement

Procoder Bharath needs to count the number of registrations for his college fest. He's too busy for something so trivial and so he asks his juniors for help. Help him determine the fastest candidate for the job. Build a website similar to this which would test a user's counting speed. Be creative!

Normal Mode

Arrange layers of numbers randomly in a square grid and allow a user to count by tapping on the numbers in ascending order

Time the user and display their score in seconds

Store the 5 best times using LocalStorage and display them.

Hacker Mode

Implement different difficulty modes with different number of layers in the grid and display high scores based on difficulty.

Make the website responsive and mobile friendly using CSS Media Queries.

Pick any colour and vary the shades of the tiles in order of the number on them. For example, 1 would be the lightest and 40 would be the darkest.

Add sound effects to the game

Hacker Mode+++++++

Something about a grid irks Bharath. Free the Forty Shades by looping the rows like a conveyer belt. (Like this)

Submission

Submission will be to your mentors. You can ask them any questions you may have.

Normal Mode is required. Hacker mode is very highly encouraged.

Submission Deadline - 25/04/2020

Required Skills

You'll need to learn basic HTML, CSS and JavaScript for this task. The main concept you'll be using is DOM manipulation.

Refer to the Beginner's guide that was posted for more resources.

Limitations

You are not allowed to use any frameworks, like jQuery, Angular, Bootstrap, or React. The code must be in Vanilla JS only. You also don't require a backend, and you shouldn't need to make one.

Good luck and happy coding!

Task 2

The Last Draw

Bharath has found his speed tester, and has assigned him his work. Bharath now sits free, with plenty of time in his hands. So he intends to play a game to pass his time. Unbeknownst to even his close friends Bharath (aka Mr. Gray) actually loves colors. Help him paint his playroom similar to this so he remains engaged while his junior completes the task.

Normal mode

Create a game where the user presses a button or taps on the screen to make a ball jump.
Generate random circular obstacles with at least two colours on each obstacle.
Touching an obstacle of different colour results in a game over.
Calculate score based on distance travelled.
Add sound effects.
Store high score in local storage.
Mr. Gray likes this game and shows it to his friend, Shake. Shake wants to shake things up a bit and suggests more features for the game.

Hacker mode

Update the high scores in real time.
Have more than two colours and add a mechanism to switch the colour of the ball.
Make buttons to pause and resume the game at any point.
Increase game difficulty by increasing the speed of rotation and direction of movement of obstacles.
Bharath and Shake really like the game, but unfortunately they can't play it together.

Hacker mode+++

Generate different types of obstacles.
Include power-ups like a multi-colour ball which can pass through obstacles of any colour, slower rotation modes etc. Use sprites for power-ups.
Have a split screen multiplayer mode so that Bharath and Shake can challenge each other.

Submission

Submission will be to your mentors and also on the site. You can ask them any questions you may have.
Normal mode is necessary, hacker mode is highly recommended.
Submission Deadline - 14th May, Thursday.

Required Skills

You’ll need to learn a fair bit of JavaScript for this task, especially using the canvas tag and the Canvas JavsScript API.

Refer to the Beginner’s guide that was posted for more resources.

Refer Canvas API

Limitations

You are not allowed to use any frameworks, like Phaser.io for example. The code must be in Vanilla JS only. You also don’t require a backend, and you shouldn’t need to make one.

Task 3: You're Invited
Subhash just got appointed as the chairman of Festember. He's really happy and wants to celebrate. Ram suggests to organise a booze party at his place. But being a chairman of such a big event, Subhash has too many friends to invite. Help subhash to develop a web application to do the invite job for him.

Normal mode:
Implement an authentication system to allow users to register on the site.
Allow users to schedule an event and create a simple invitation for the same.
Allow creation of simple text based invites with components like Header, Body, Footer etc.
Create dynamic links for invitation which can be visited to view the invitation.
Users must be able to accept / reject invitations.
Support private events - allow the host to send the invitation only to people they wish to invite.
Create a dashboard for a user to view events they have created and invitations they have accepted.
Use prepared statements to prevent SQL injection.
Have a neat, intuitive UI.
Hackermode:
Implement support for customisable invitations (like fonts, colors etc) - Be creative!
Notify users when they receive an invitation, someone accepts their invitation etc.
Add support for user response while accepting invitation. (Like how many people they're bringing, food preferences etc)
Allow the host to set a deadline to accept an invitation.
Have templates for invitations (Birthday Party, Wedding, Funeral etc)
Make the website responsive.
Hackermode++:
Support addition and dynamic placement of images in the invitation.
Implement an attendance tracking system for the events.
Google Calendar API integration for users to keep track of events they're attending.
Use an Email API to send invitations to users via email.
Submission
Submission will be to your mentors. You can ask them any questions you may have.

Normal Mode is required. Hacker mode is very highly encouraged.

Submission Deadline - Wednesday, June 10th

Required Skills
This task involves learning backend web development. Youll need to learn about HTTP, web servers, and databases.

Refer to the Backend Guide for resources.

Limitations
Micro-frameworks are okay. MVC frameworks are not allowed.

For example, these are okay - Raw PHP, Express (NodeJS), Flask (Python)

These are not - Laravel (PHP), Django (Python), Spring (Java)

If youre using anything other than raw PHP, its a good idea to just check with your mentor once.

For the frontend, the same restrictions as the previous tasks apply. No frameworks like jQuery or React.

https://zzzscore.com/1to50/en/