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CS406

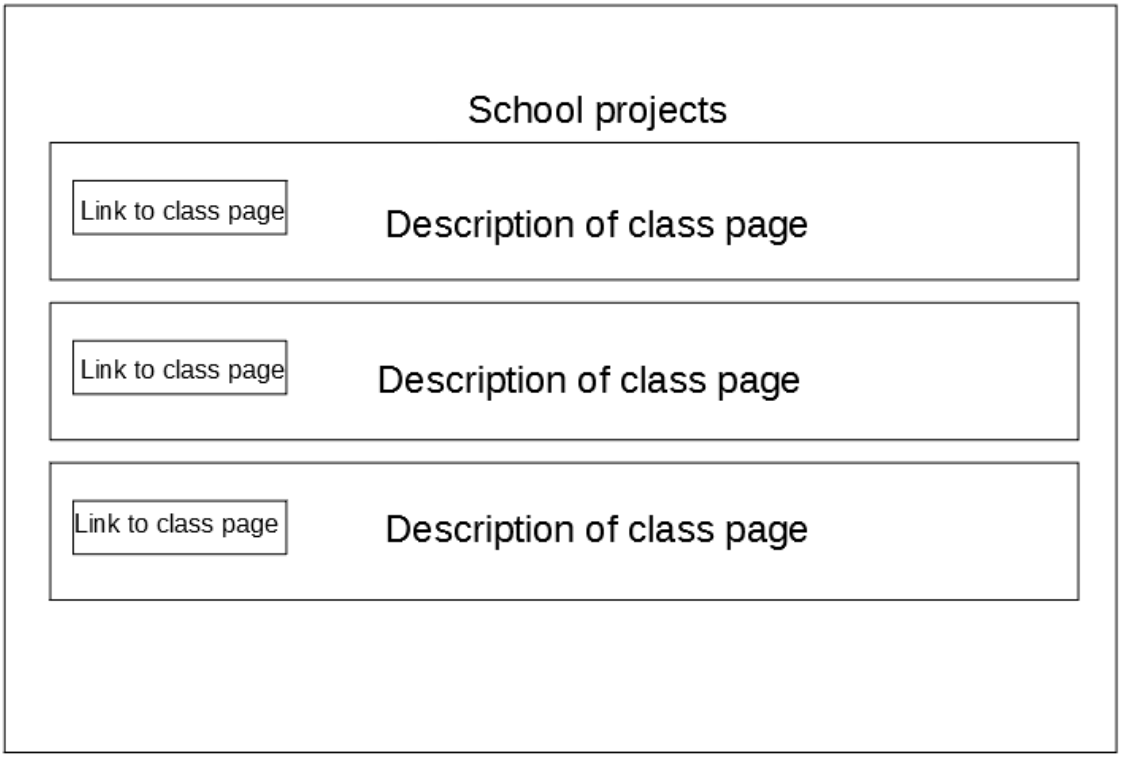
Final Project Report

It is always a good idea to have a portfolio that contains some or all of your notable work done in the past to show to potential employers. I have chosen to complete a portfolio website as my personal project for this class, and I personally think it has come out pretty well. The website shows off several projects and other work that I have done in classes that I have taken in the past, and it is up to date as of the time of this writing.

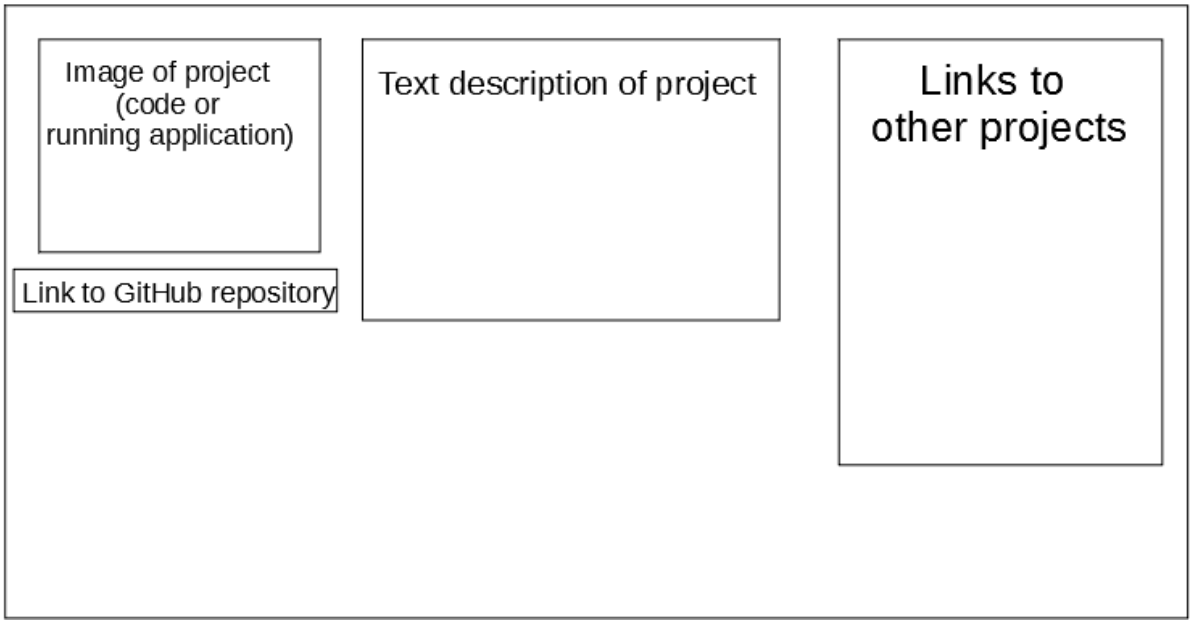
The website acts as a portfolio for me. It contains my resume with a downloadable link, a short description of myself and my interests, a page that lists all of my projects from college classes, and a page that lists 3-dimensional models of some past projects built in my woodshop.

The “About” page on the website consists of a short description of me and a list of some of my hobbies/interests. Below this is a resume that gives a contact email and a link to a GitHub profile that contains repositories of several past and current projects done while in college. Also contained in the resume is a listing of skills and proficiencies that I have, a section about where I went to college, and then a short list of some notable projects that were completed during college. This resume is downloadable through the link provided below the resume.

The “School Projects” page contains a list of work that was completed in several classes that I have taken during my college career and before then. Each class has its own entry in the “School Projects” page, with a button that links to a separate page for that class and a short description of what that page contains. The format for the “School Projects” page is shown below:



Each class page contains a longer description of the work that was completed in that class, as well as a link to a GitHub repository that contains the code for that class. Some repositories linked in the project pages are subdivided into separate assignment folders, while others will just contain project/source code files. Above the link to the GitHub repository will be an image that shows something relevant to what the class was about: a running program or some code from one of the assignments. The layout for the class pages is shown below:



The “3D Projects” page follows the same format as the “School Projects” page. Each 3D project has its own listing in the “3D Projects” page, with a short description and a button that links to a separate page for that project. Within each 3D project page, there exists a 3-dimensional model viewer that shows a model of the project that was created in the real world. The “Box” project page shows a 3D model of a box with a lid that I made in my woodshop as a commission. On the right of each 3D project page is a list of other 3D projects, each entry linking to another project page. Other 3D project pages follow this same format and contain similar content.

The whole website has a header, which shows my name (Gauge M. Hartwell) and an email address where I can be contacted. There is also a footer on every page that lists the owner/creator of the website (Gauge M. Hartwell) and the website’s theme (“Signify Dark” by WEN Themes). The name in the footer is a link that directs the user back to the “About” page of the website.

The tools used to create this website are mostly within WordPress, with a few other things along with it to get the functionality I wanted from the website. I used WordPress as the base platform to build the website with because WordPress allows for a lot of customizability and it is relatively simple to use. WordPress can be finicky with things like lists and sidebars, but there are a lot of tutorials on the internet that help to get those things working correctly. To develop the website, I hosted it on my local machine with XAMPP. XAMPP is a program that allows the user to run a web server (not accessible by the internet) on their local machine for development purposes. XAMPP comes with PHP and Perl interpreters, an Apache HTTP Server, and a MariaDB database. Plugins can be installed to XAMPP using Bitnami (a library containing installers for several plugins that are used for development), which makes it very easy to get a development environment up and running. I used Bitnami to install WordPress into XAMPP, which allowed me to access and create my website on my local machine. I also used GitHub for this project, as my GitHub profile has several repositories in it that have my classwork and past projects in them.

Within WordPress, I used several different plugins to assist me in implementing the functionality I wanted from my website. The most-used plugins on my website are those that allow me to make custom sidebars for the website (they are aptly named “Custom Sidebars” and “Easy Custom Sidebars”). I used two different plugins together to help me with making one sidebar that is added to the site theme (only one sidebar was included in the theme, more on that later), and another that allows me to replace that sidebar on a page with a list of other related pages. I was able to set which pages displayed specific sidebars with two more plugins that allowed me to put a tag on a page (“Simple Tags”), then put that page into a category based on that tag (“Create And Assign Categories For Pages”) and display specific items on a page with that tag. For instance, a class page has a tag called “project page,” and the sidebar plugins mentioned above are only displayed on pages with that specific tag. The same functionality is used on the “3D Projects” pages. Each project page has a tag called “3D

project," and a sidebar is displayed on pages with that tag that contains links to other 3D project pages. On the "About" page, I used a plugin called "Resume Builder" to recreate my resume on the website. The plugin has the user input their experience, education, and other notable projects or skills that they want to display on their resume, then it formats all of that information into something resembling a resume and displays it on its own page. The resume can be embedded on another page, and the embed contains a link to the separate page that shows the resume in full detail. For the 3D project pages, I used a plugin called "Woo 3D Viewer" to display the 3D models I had created and wanted to display. The plugin allows the user to zoom in and out on the model, rotate it and move it around the screen however they want. I looked at other plugins to display my 3D models, but none of them had the functionality that I wanted. There was one called "Canvasio3D Light" that seemed promising until I tried to display too many 3D models on the website. The "Light" version of that plugin only allowed a couple of models to be shown on a website, unless the user had the paid version of the plugin. I did not want to pay for any plugins, so I continued to look for a better option (The better option was Woo 3D Viewer). Another plugin that I tried was called "Vrm 360 3D Model Viewer." It had a few of the same issues that the Canvasio3D one had: only a limited number of plugins and not much usability in the model viewers. This plugin also generated massive shortcodes that were used to display the model viewer on a page. This noticably slowed down the page loading, so I didn't think it was scalable to an entire section of my website. A third plugin that I tried was called "Spin 360 deg an 3D Model Viewer." It was created by the same author that made the "Vrm 360 3D Model Viewer" plugin (named Maurice). It had several of the same functions as his other plugin, and so it also had the same issues. I finally found the Woo 3D Viewer plugin after looking at a few other plugins that were either paid or simply not usable (some of them were really bad – user couldn't move the model around in the viewer, the model just stayed still, the model viewer was difficult to display on the page, and the plugin sometimes just couldn't find the model I wanted to show on the page).

Every WordPress page is contained within a database that is accessible through phpMyAdmin, which is included with an installation of XAMPP (as I mentioned before). This is great, because it is easy for me to access the files on the database should I ever decide I want to change the hosting platform of my website. The website is not currently hosted anywhere except on my local machine, but that will be the next step in working on this project.

On the topic of potentially migrating my website to a different host, there are two more plugins I have installed that assist with such a thing: "WP File Manager" and "All-in-one WP Migration." WP File Manager is a simple file manager that allows the website admin access the files that are used for the website for whatever they need to do. It basically acts as a direct link to the database table that handles the WordPress website pages and other files. The other plugin is self-described as a "Migration tool for all your blog data. Import or Export your blog content with a single click." It adds an option to the WordPress admin dashboard for itself, and the user then chooses where they want their

content and data exported to, then the plugin automatically exports the website to their selection. The user can export their website to a single file (which can then be imported to another WordPress instance to quickly and easily re-create the website on another host), to any data-storage service like Google Drive, DropBox or OneDrive. I chose not to export my website because the options for exporting the website to anything other than a local file required an extension that cost $99, and I had no desire to pay that much to export a small website.

For hosting my website, I looked at several options for online hosts and did not want to use any of them at this time. There were several paid options for website hosting, including Google Cloud Platform, Amazon Web Services, BlueHost, GoDaddy, and Dreamhost. All of these options had a monthly fee for web hosting that I did not want to pay, even though they had good hosting services and would have worked out just fine for my website. My search then led me to some of the free options, which consisted of OSU web hosting on my personal drive, InfinityFree.net, WordPress.com, a WordPress blog creator that was maintained by OSU, and simply self-hosting my website. I was suspicious of InfinityFree.net because I didn't trust a free web host provider with any of my personal information, so that was out as an option. WordPress hosting just led me back to Bluehost and DreamHost, and those were already ruled out, so I skipped over that as well. In order to host a website on my engr drive, I would have had to set up a database that could correctly handle a WordPress website, install wordpress on my drive in the engr server, and then migrate my website to there. That was out of the scope of my project in terms of time, so I decided to try the WordPress blog creator that is maintained by OSU. I created a blog and found it lacking right away. There was no flexibility in terms of plugins, as there were only a set number of plugins that were allowed for the blog. There were only specific themes allowed for the blog and I could not import or create my own theme. I did not want to go through the process of re-creating my entire website, especially without the plugins that I needed (like the resume plugin and the 3D model viewer), so that option was out.

I did some research on self-hosting a website, and I was unable to find any definitive information on whether my current internet plan allowed for self-hosting. I also would have the website running on my personal computer, which posed some security risks from potential cross-site scripting or other injection attacks. Self-hosting on my personal computer would lead to issues of website availability as well, as I turn my computer off or put it in sleep mode at night. Another option for self-hosting would be to set up a separate computer to host the website, but that would require me to have a spare computer to dedicate to such a task. This extra computer would have to be quiet (because I do not want to listen to a CPU fan running constantly), energy-efficient (because I don't want to be using more power than I need for a website), relatively small (so that it could be put somewhere out of the way), so a laptop would not exactly fit my requirements. A small-form-factor computer would work out well for this, and I could create one out of something like a Raspberry Pi computer. Doing such a thing would require the monetary investment of buying a Raspberry Pi and the other hardware that I

would need to keep one running, as well as the time investment of setting it up to host a WordPress website. This was out of the scope of my project as well, as far as time goes.

I am left with my website existing solely on my personal computer right now, and I will have to host it on a paid platform in the future when I have the funds to do so, if I decide not to go with the Raspberry Pi idea. In the meantime, I will continue to develop the project further to include more projects and show more of my experience as a developer.

With GitHub, I was able to have my past work all contained in one location that is easily accessible on the internet. This was crucial for my project because I would not have been able to easily get the website working the way I wanted it to without GitHub or some other service like it. I could have used something like BitBucket, but I already had a GitHub account and it already had some of my class work in it from earlier in my college career. To use GitHub the way I wanted to, I created separate repositories for each class I had taken in the past, or classes that I am currently taking, with work that was notable or relevant to my degree and career. Within each repository, I uploaded source code for projects or assignments that were done in that class and then made a link in my website to that repository for the website user to view. As mentioned before, each class page on my website contains a link to the repository in my GitHub profile that corresponds to that class page.

The “About” page was the first page I created. It was the page that introduced me to several of the tools and functionalities that are included in WordPress. To create the page, I first added the “About” label for the page. This lets the user know where they are in the website, if it isn’t exactly clear to them right away. I then added the short description of myself (all it really says is my name and that I’m graduating in 2021) and then added another line about my interests. The resume is the main focus of the page, and that was created using a plugin, which I described above.

To create the “School Projects” page, I used my layout diagram (shown earlier, as well as in my project plan) to give me a goal for the look of the page. I really appreciated the visual editor in WordPress for this because of the block system. The block system is a feature in WordPress that allows the content creator to make new “blocks” on a page that contain whatever content the creator wants them to contain. Each block takes up a portion of the page and can be resized to whatever the creator wants. Each block can also contain specific types of data, whether that be simple text (the paragraph block), text in a specific format (like a bible verse, song lyrics, a book title, etc.), or even some media (like an image or some audio). I chose to have each block on the page be a “column” block, which is subdivided into sections that can contain their own content. It works as essentially nested blocks. I then put a button on the left side and a basic text description on the right side. The button links to a class page and the description does just that: describe what the class page is about. I made a

new block like this for each class that I had a GitHub repository for and then moved on to creating each class page, which was a bit more tedious.

Each class page was created to follow the layout I had made for my project plan and which is also shown earlier in this paper. I used the column system here as well to help divide the content on each class page into the sections I wanted. This took a lot more time than I had expected, but that was alright with me because I did not have to do it all by hand (that would have taken way too long). I put just one block on each class page and had it divided into two columns with a 30/70 ration. 30% of the block was used for an image that related to the class work and a link to my GitHub repository for that class. The other 70% of the block was used for a description of what the class was about and the work I did while in that class. The class pages were where the sidebar plugins were very useful, because I could put class pages into their own category, then display a sidebar on just the pages in that category. The sidebar on the class pages contains a list of other class pages, and is persistent across every class page. Each class page follows the same format/layout as described here, which took some time because I needed to find something in the work I did for each class to take an image of in order to display it on that class page, as well as making a GitHub repository for each class and making sure the sidebar was correct for each class page as well.

The “3D Projects” page was created in a very similar way to the “School Projects” page. Each project has a block on the page, divided into columns containing a short description and a button that links to that project page. The projects are intended to be displayed in a way that resembles a list, with each entry having a link to that project page. The layout of this page is meant to be pretty much the same as the “School Projects” page.

Each 3D project page is also intended to have a similar layout to a class page. There is a sidebar on the right of each project page that contains a list of other projects, each entry linking to that project page. The difference with the 3D project pages is that most of the page is taken up by a 3D model viewer that the user can interact with. There is currently no description of the project on the 3D project page. The 3D model viewer allows the user to interact with the model however they like. The models themselves are not interactive, however. The user can leave the model viewer alone, so it self-rotates until the user interacts with it. The model viewer lets the user zoom in and out on the model to look more closely at a specific part of it with the scroll wheel on their mouse or with the buttons on the top of the viewer window, rotate the model however they like with a right-click-and-drag or with a button at the top of the model viewer, make the viewer full-screen to get a better view of the model, capture a screenshot of the model with the camera button on the viewer, and even make the model viewer show the model as a wireframe so that they can see individual parts of it in more detail.

Every single page on the website has a header at the top that shows my name and one of my email addresses, with a list of the main pages of the website right below that. The “About” page, “School Projects” page, and the “3D Projects” page have links in

the header. I made the header by using the “menus” option in the WordPress site customizer. WordPress allows the website/blog creator to edit superficial features of the website as a whole, such as the header (referred to as “Site Identity”), any menus that are used, and which page is the website’s homepage. I created a menu that I wanted to use as the main navigation for the website, then set it as the main navigation menu. Within this menu creation tool, I also made the menus that I used for the sidebars within the class pages and the 3D project pages.Also present on every page within the website is a footer that shows my name (which links back to the “About” page) and which theme I’m using.

To create the sidebars that I used within the website, I first created new menus that contained links to pages that were within the same category on the website. For instance, 3D project pages were grouped into one menu and class pages were grouped into another. After this, I used the “Custom Sidebars” plugin to create a new sidebar that was then built into the website theme by the plugin. After this, I used the other sidebar plugin, “Easy Custom Sidebars,” to make two sidebars that could replace an existing sidebar and be displayed on a webpage. The sidebar I created for the class pages dislpayed the menu I made for the class pages, and the sidebar for the 3D project pages displayed the menu I created for those pages. Next, I used the “Simple Tags” and “Create And Assign Categories For Pages” plugins to tag each class page with a “Class” tag and each 3D project page with a “3D Project” tag, then put those pages into separate categories based on their tags. Finally, I displayed each sidebar on its respective list of pages by assigning it to that category of pages, and that concluded the work on the sidebars.

The repositories I have created on GitHub for this project were pretty simple to make, as GitHub has functionality built into it for just this purpose. I logged in to my GitHub account, went to the “Repositories” page, and selected the “New” button that allows the user to make a new repository. Once the repository was created, I selected the “Add file” button and chose the “Upload files” option. This allowed me to choose which files I wanted to put into the repository and then it handled uploading the files to their repository for me. This was an easy part of the project, if tedious at times with some of the projects I have done in past classes being complex and including quite a lot of files (one project had over files just for testing it). The only issue I ran into with this part of the project was GitHub only allowing 100 files to be uploaded at a time. This was more of an inconvenience than anything, so I wasn’t too bothered by it.

This whole portfolio website is intended to be useful to me for a very long time. I will continue to update and improve it with projects and other notable work that I complete throughout my career so that I can direct potential employers to it whenever I want to show them what I am capable of and what experience I have. In the future, I want to expand the website to include separate sections for each of my hobbies, personal projects, and professional projects that I contribute to. This website will need to be hosted somewhere that is accessible from the internet eventually, and that will be the

next step in the evolution of the website. Right now, I am pleased with how it has turned out because I was able to get the whole website to look exacly how I envisioned it, and it is relatively easy for me to extend it to show whatever I want as I continue to develop as a professional.