WASHINGTON STATE UNIVERSITY
VANCOUVER

CS 320 Course Project Final Report

CS 320

Bayerische Spezifikation

Prepared by

Group Name: The Big Three

Colton Berry	**11622807**	**Coltonberry7@gmail.com**
McGuire Croes	**11622082**	**Mcguire.croes@gmail.com**
Quinn Croes	**11626015**	**Quinn.croes@gmail.com**

Date: 12/16/2020

CONTENTS II

Link to The Git Log: https://github.com/cberry31/Bayerische-Spezifikation

1 Introduction

The project BMW Information is a formal site regarding the specifications of BMW vehicles. In this project, values of MPH, wheelbase, HP, and other attributes of the vehicles will be listed. The project will include the functionality of the user to compare different attributes of vehicles listed in the project.

1.1 Project Overview

Bayerische Spezifikation is a site that will allow users to search through various BMW vehicle models and compare different attributes. The system will use a data driven diagram, perfect for our site as it is a data based. The site will offer a compare functionality, allowing users to make a selection on a car attribute, it will then compare it to another attribute selected by the user.

1.2 Definitions, Acronyms and Abbreviations

There are no acronyms or abbreviations that are included in the SRS or SDD that need to be defined. All listed information of the site is information know by all users, developers, and programmers. Any abbreviations, definitions, or acronyms that may need to be defined are HTML and CSS. HTML meaning HyperText Markup Language allows for the creation of the content of a webpage. CSS meaning Cascading Style Sheet, this allows for the changing and styling of the HTML

1.3 References and Acknowledgments

*“*BMW 3 Series (E21),” 05-Nov-2020. [Online]. Available: https://en.wikipedia.org/wiki/BMW_3_Series_(E21). [Accessed: 02-Dec-2020].

J. Hughes, “The E21: The Runt of the BMW 3 Series,” Autotrader, 24-Apr-2020. [Online]. Available: https://www.autotrader.com/car-news/e21-runt-bmw-3-series-281474979881371. [Accessed: 07-Dec-2020].

“BMW 7 Series (E23),” Wikipedia, 07-Dec-2020. [Online]. Available: https://en.wikipedia.org/wiki/BMW_7_Series_(E23). [Accessed: 07-Dec-2020].

“BMW E23,” Classic Cars Wiki. [Online]. Available: https://classiccars.fandom.com/wiki/BMW_E23. [Accessed: 07-Dec-2020].

“BMW 6 Series (E24),” Wikipedia, 02-Dec-2020. [Online]. Available: https://en.wikipedia.org/wiki/BMW_6_Series_(E24). [Accessed: 07-Dec-2020].

“BMW 635 CSi (E24) specs & photos - 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989,” autoevolution. [Online]. Available: https://www.autoevolution.com/cars/bmw-635-csi-e24-1978.html. [Accessed: 07-Dec-2020].

“BMW 5 Series (E28),” Wikipedia, 24-Nov-2020. [Online]. Available: https://en.wikipedia.org/wiki/BMW_5_Series_(E28). [Accessed: 07-Dec-2020].

"BMW 3 Series (E30)," Wikipedia, 30-Nov-2020. [Online]. Available: https://en.wikipedia.org/wiki/BMW_3_Series_(E30). [Accessed: 07-Dec-2020].

M. McKay, "Buyer's guide: BMW E30 3 Series," 23-Nov-2018. [Online]. Available: https://www.classicandsportscar.com/features/buyers-guide-bmw-e30-3-series. [Accessed: 04-Dec-2020].

"BMW 8 Series (E31)," Wikipedia, 08-Nov-2020. [Online]. Available: https://en.wikipedia.org/wiki/BMW_8_Series_(E31). [Accessed: 07-Dec-2020].

M. McKay, "Buyer's guide: BMW 8 Series (E31)," BMW 8 Series (E31) buyer's guide: what to pay and what to look for | Classic & Sports Car, 24-May-2019. [Online]. Available: https://www.classicandsportscar.com/features/buyers-guide-bmw-8-series-e31. [Accessed: 07-Dec-2020].

"BMW 7 Series (E32) specs & photos - 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994." [Online]. Available: https://www.autoevolution.com/cars/bmw-7-series-e32-1986.html. [Accessed: 05-Dec-2020].

"BMW 7 Series (E32)," Wikipedia, 23-Nov-2020. [Online]. Available: https://en.wikipedia.org/wiki/BMW_7_Series_(E32). [Accessed: 07-Dec-2020].

C. Chin, "Through the Years: 1989-1995 BMW 5 Series (E34)," Automobile Magazine, 25-May-2018. [Online]. Available: https://www.automobilemag.com/news/years-1989-1995-bmw-5-series-e34/. [Accessed: 07-Dec-2020].

"BMW 5 Series (E34)," Wikipedia, 23-Nov-2020. [Online]. Available: https://en.wikipedia.org/wiki/BMW_5_Series_(E34). [Accessed: 07-Dec-2020].

N. DeMattia, "BMW E36 3 Series Buyers Guide - What Model To Buy," 04-Aug-2020. [Online]. Available: https://www.bmwblog.com/2020/01/31/buyers-guide-bmw-e36-3-series-what-to-look-for/. [Accessed: 05-Dec-2020].

"BMW 7 Series (E38)," Wikipedia, 28-Nov-2020. [Online]. Available: https://en.wikipedia.org/wiki/BMW_7_Series_(E38). [Accessed: 07-Dec-2020].

A. Tock, B. L. Contributor, and T. Beatty, "Was The E38 The Peak 7 Series?," BimmerLife, 20-Jul-2020. [Online]. Available: https://bimmerlife.com/2020/07/18/was-the-e38-peak-7-series/. [Accessed: 07-Dec-2020].

"BMW 3 Series (E36)," Wikipedia, 23-Nov-2020. [Online]. Available: https://en.wikipedia.org/wiki/BMW_3_Series_(E36). [Accessed: 07-Dec-2020].

"BMW 5 Series (E39)," Wikipedia, 03-Dec-2020. [Online]. Available: https://en.wikipedia.org/wiki/BMW_5_Series_(E39). [Accessed: 07-Dec-2020].

A. Tock, B. L. Contributor, and T. Beatty, "Was The E38 The Peak 7 Series?," BimmerLife, 20-Jul-2020. [Online]. Available: https://bimmerlife.com/2020/07/18/was-the-e38-peak-7-series/. [Accessed: 07-Dec-2020].

Images were found from the following sites.

https://www.carpixel.net/galleries/b/30/bmw.html https://bimmertips.com/bmw-e21-oem-paint-color-options/

https://bringatrailer.com/listing/1985-bmw-735i-4/

https://driving.ca/porsche/auto-news/news/8-reasonably-priced-alternatives-to-a-classic-porsche-911

https://drive-my.com/en/blogs/entry/bmw-e28-s50-engined.html \

https://routehunters.co/index.php/2020/05/24/the-bmw-e30-8-reasons-why-its-a-cult-classic-today/

https://www.bmwblog.com/2017/06/29/iconic-e31-bmw-850csi-goes-drive-famous-transfagarasan-road/

https://www.bmw-sg.com/bmw-models/bmw-e32-750il-photoshoot/2017/02/07/

https://bringatrailer.com/listing/1991-bmw-m5-87/

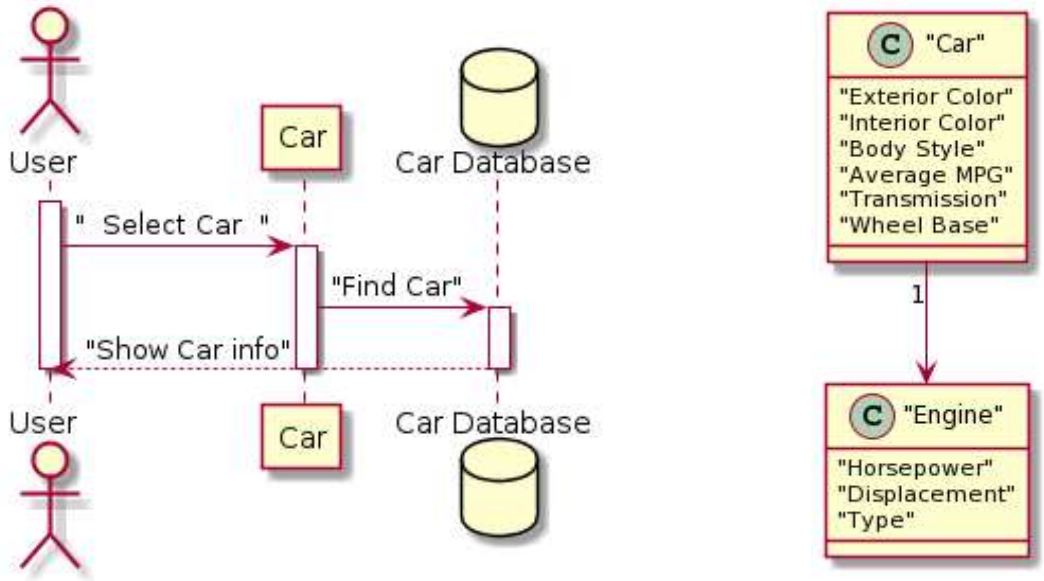
https://www.bmwblog.com/2017/08/15/photoshoot-iconic-bmw-e36-m3-gt/

https://www.bmwusanews.com/image-gallery.do?method=view&imageGalleryId=343

2 Design

2.1 System Modeling

Implementation strictly follows the Design Documentation from Milestone 2



2.2 Interface Design

Figure 1 depicts the landing page, this is the page that users will come to when launching the website. From here it shows the various vehicles that are included in the web page and the search bar at the top. In addition the landing page also shows the home tab which includes the About us, Compare Function, and Car List.

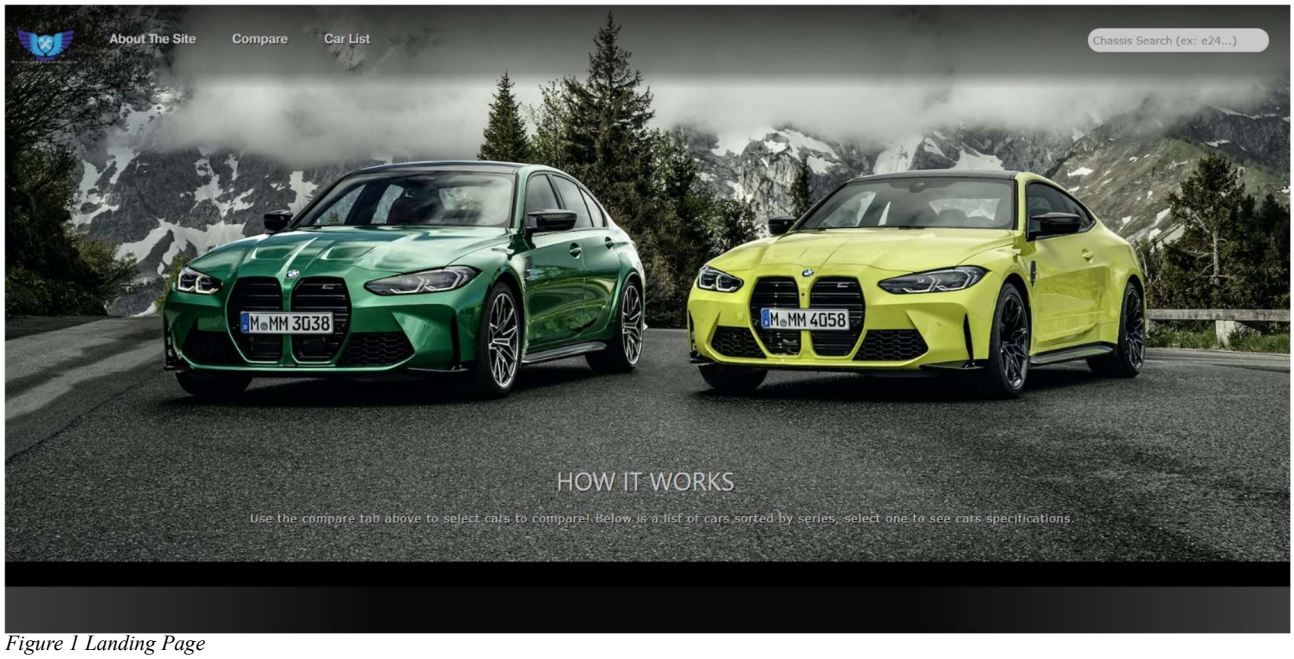


Figure 1 Landing Page

Figure 2 shows the bottom half of the landing page, from the landing page, the users will be able to select the vehicle they are looking for. In addition to the cars being listed on the landing page, the search functionality is also implemented. Each car image also acts as a button, allowing the users to select certain car models, from there the list. Once the image has been selected, the site will load the new page containing all the information about the car they have selected.

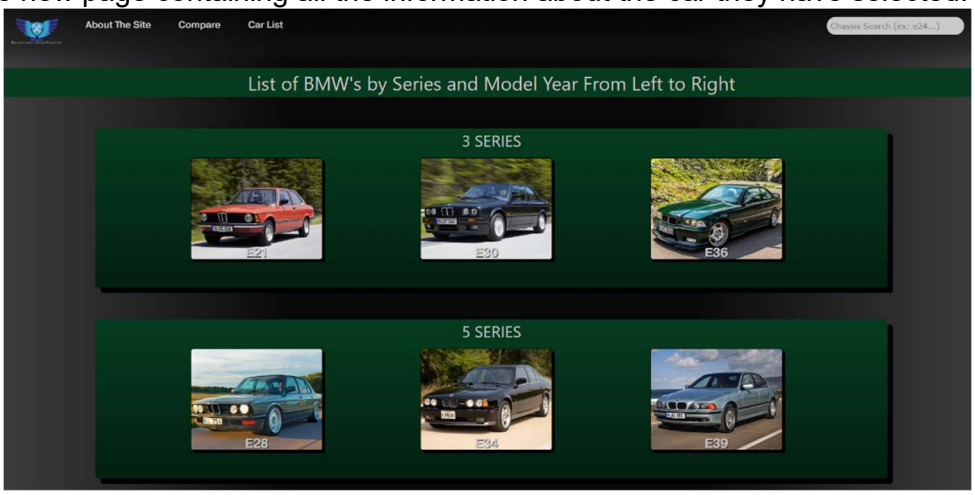


Figure 2

Figure 3 shows the car page after the user has selected a vehicle. Once the page has loaded the site provides the user with an image of the car they have selected as well as the data about the car. In addition to the data about the car, a brief description is included to inform the user about the history of the car.

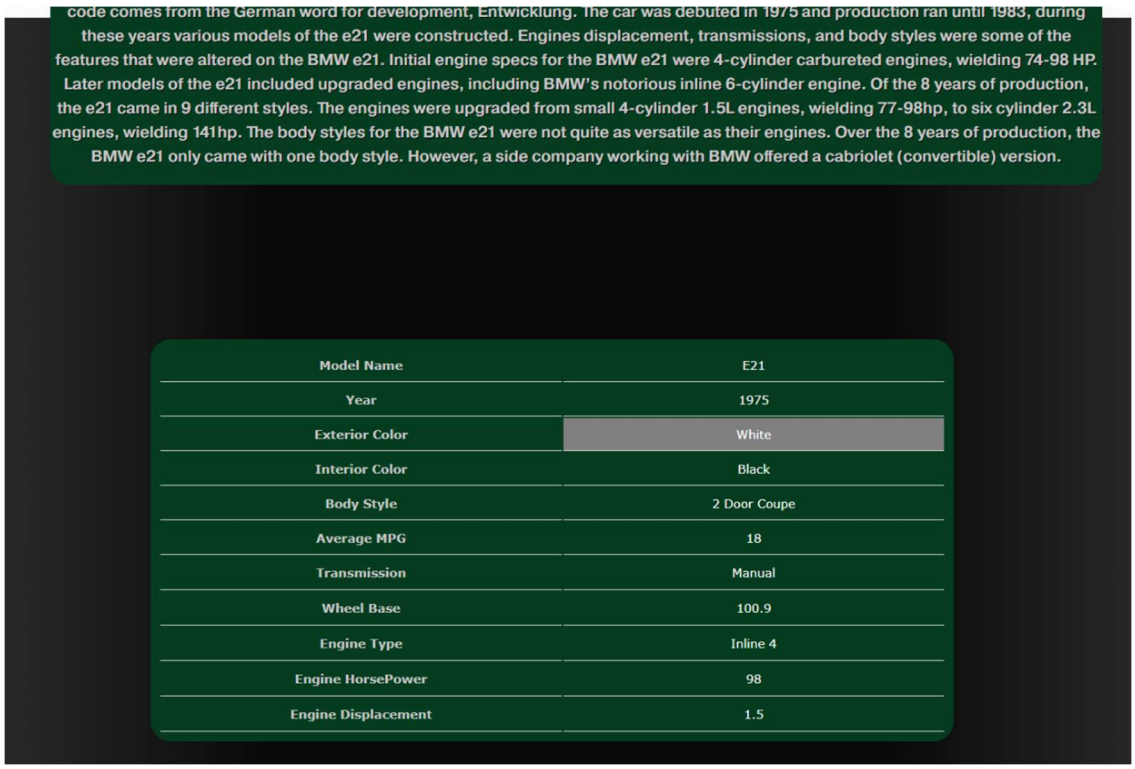

code comes from the German word for development, Entwicklung. The car was debuted in 1975 and production ran until 1983, during these years various models of the e21 were constructed. Engines displacement, transmissions, and body styles were some of the features that were altered on the BMW e21. Initial engine specs for the BMW e21 were 4-cylinder carbureted engines, wielding 74-98 HP. Later models of the e21 included upgraded engines, including BMW's notorious inline 6-cylinder engine. Of the 8 years of production, the e21 came in 9 different styles. The engines were upgraded from small 4-cylinder 1.5L engines, wielding 77-98hp, to six cylinder 2.3L engines, wielding 141hp. The body styles for the BMW e21 were not quite as versatile as their engines. Over the 8 years of production, the BMW e21 only came with one body style. However, a side company working with BMW offered a cabriolet (convertible) version.
Model Name E21
Year 1975
Exterior Color White
Interior Color Black
Body Style 2 Door Coupe
Average MPG 18
Transmission Manual
Wheel Base 100.9
Engine Type Inline 4
Engine HorsePower 98
Engine Displacement 1.5

Figure 3

3 Implementation

3.1 Development Environment

Data was received from various websites and organizations. Vehicle data was also recorded from the developers. Ownership of some of these vehicles allowed for direct measurements to be made and recorded. The IDE's, and programming languages that were used were the following. VS Code, IntelliJ, CSS, HTML, and javaScript were used to format and complete our project. Git was also used as it allowed for the project to be worked on from various machines, allowing for quick development.

3.2 Task Distribution

Colton Berry- Backend, testing JS Files, CSS, HTML, creating computing functions of the site, as well as server development
Quinn Croes- Developing CSS, HTML, and UI pages for the site.
McGuire Croes- Data recording, vehicle research, appropriating citations for data sources. SRS Updating, CSS, HTML.

3.3 Challenges

One of the main challenges faced when creating the site, was the process of linking the frontend to the backend development. In addition to this challenge, one of the more common issues we encountered came from the HTML site, and the functionality of the data. Linking the images, buttons, backgrounds was difficult and frustrating as it was small errors that threw the entire process off.

4 Testing

Testing Plan

Functions to Test

1. -Find Cars
2. -Find Year
3. -Find body Style
4. -Find Engine Size
5. -Find Exterior color
6. - Compare Cars
7. Compare HP
8. -Compare Engine Displacement
9. -Compare Year
10. -Compare Transmission
11. -Each car button links correct page to the car they select.

Test 1-3 completed 12/15/2020, initial results threw an error for the data being searched through, incorrect data inserted into wrong data place.
Test 4 and 5 completed 12/12/2020, tests completed after testing 1-3. Results from testing 4 and 5 showed that engine size had incorrect data type, needed to remove the 'L' representing engine displacement in Liters.
Tests 6-7 completed 12/15/2020, compare cars shows the correct data type and format. Error in comparing HP. Same error as in step 4 and 5, incorrect data format, needed to drop the 'HP' in engine power.
Testing 8 completed 12/15/2020, expected the same error previously stated with incorrect data values, removed the 'L' denoting the engine displacement.
Testing 9-10 completed 12/15/2020, No errors in running tests with the data, values allowed to be compared.
Testing 11 completed 12/15/2020, Car buttons completed, initial tests resulted in errors with linking the correct image to the button clicked.

4.1 Tests for Functional Requirements

The site must be able to update the car page for each button click. When the user selects, the site must display the correct image, description, and data for the selected vehicle. Initial tests were failed as data was not correctly loaded. When the compare function is selected, the site must load the compare page. When data is selected from the compare page, the data selected must accurately represented, and be from the vehicle selected. The system passed the compare functions data correctly. In addition the site was testes for any overlapping errors, navigating to each tab from every other tab, ensuring we had no underlying errors in the site.

4.2 Tests for Non-functional Requirements

The site was tested for images being loaded correctly and displaying in the right format. Button presses were also tested, this means that when the button was pressed the correct actions were completed. The search bar was also tested as it needed to correctly show the results of the search. Initial models of the search bar were not correctly loaded and did not present the user with the correct information. The search function was not tested for errors or non valid search queries. Dropdown menus were also tested, these needed to display the correct data as well as be buttons. The dropdowns were first tested for accuracy in the data displayed, later tests involved button presses.

4.3 Hardware and Software Requirements

In order for all the features of the site to be run correctly, the monitor of the user must be a resolution of 1920x1080. The site was constructed and launched through the chrome link, any other web browsers may cause errors when loading the site. Internet connection is needed in order to run the site. Basic motherboards and processors were used when testing the software and implementing design changes to the site.

5 Analysis

Milestone 1
Colton Berry- 5 Hours
McGuire Croes- 6 Hours
Quinn Croes- 6 Hours

Milestone 2
Colton Berry- 10 Hours
McGuire Croes- 10 Hours
Quinn Croes – 11 Hours

Milestone 3
Colton Berry-20 Hours
McGuire Croes-18 Hours
Quinn Croes- 19 Hours

From the perspective of the group, it is milestone 3 that took the most effort. Milestone 1 was a tedious but necessary part of the of the process as it set up the path for completing the project. This milestone took time but was not complex to implement. Milestone 2 took more time as this milestone was now cementing the process and procedures for the site and what requirements there will be. Milestone 3 was the most difficult milestone as we now have to do the work to make the site work. The compare function, data page for each car, and the homepage now needed to be created.

Additionally, each page had to have buttons that linked the pages together and link them correctly. In addition to this work, the previous milestones hindered our progress on our site. Milestone 2 showed how the site would work and how the data would be displayed and compared, we were then obligated to follow the path we set for ourselves from the past. One challenge that we had to overcome was not to be limited by the past milestones.

Other factors that have contribute to more time dedicated to milestone 3, is new implementation and ideas. As the site has developed and grown, new ideas have surfaced that benefit the site. Some of these ideas include new features to the landing page, better ways to implement the search function, and a simpler way to store the data for the cars. All of these reasons have affected the time dedicated to milestone 3.

6 Conclusion

Working through the project was and interesting, and quite different from different projects that have been completed in the past. Previous projects were either completed with little to no planning or just pushed out with no care. Organization was also not present in previous projects. Completing the SRS, and SDD has helped greatly in the final organization and project work. The SRS and SDD allow developers to go back and review the processes and data requirements made for the project. In addition, testing and coding methods have been implemented together. One of the more impactful methods of coding has been Pair Programming. With current technology, the group has been able to code and implement ideas quickly and efficiently with the aid of Pair Programming.

Project milestones have also helped greatly. Normal projects consist of a start date and a simple final data, no intermediate check ups or deadlines included. Milestones allow the developers to have smaller goals that are achievable. In addition, these milestones allow developers to test their code incrementally before the final release of a project.

Appendix A - Group Log

< *Describe how frequently the group members meet during the semester, and how effective the communication is. This is optional for one-person projects.*>

Date	Objective/completed	Duration(hr:min)
11/23/20	Initial backend for project site	2:00
11/28/20	Changes to initial SRS document	1:45
11/29/20	Added attributes and Citations for SRS	2:35
11/30/20	Data collection of vehicles	2:00
12/1/20	Write up of vehicle descriptions	1:30
12/5/20	HTML page construction	2:00
12/6/20	HTML design and layout revision	3:00
12/8/20	CSS font and layout of site	2:16
12/9/20	Functionality testing of the site: search and compare funct.	3:00
12/11/20	Finalize page setup and CSS styling	2:20
12/14/20	Check data values and link pages to correct buttons	3:00
12/14/20	Implement correct pages for vehicle chassis	2:45