Technical Report

Project Exam 1:

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Word count

Summary: 90 Main text: 2743

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1.Summary

In this project exam I have been asked to build a microsite for SpaceX or NASA. This Site should focus on space technology. I have chosen to concentrate around NASA, mars and the international space station (ISS). In this project exam I have been working on planning, research, design and coding HTML,CSS and JavaScript. For the JavaScript part, API calls and DOM manipulation has been especially important. For this project I have created a GIT repository found here: https://github.com/audksamu/AW33-Project-Exam
I also have published the final web site at: http://audkstudent.com/aw33/index.html

2. Body

2.1. Introduction

In this project, I am asked to build a microsite for SpaceX or NASA. The site will focus on space technology, and it is set aside 10 weeks to complete the assignment, with submission on May 9th. I decided to build the microsite with focus on NASA Mars program and on the International Space Station, ISS. The target audience is young people under 25 years.

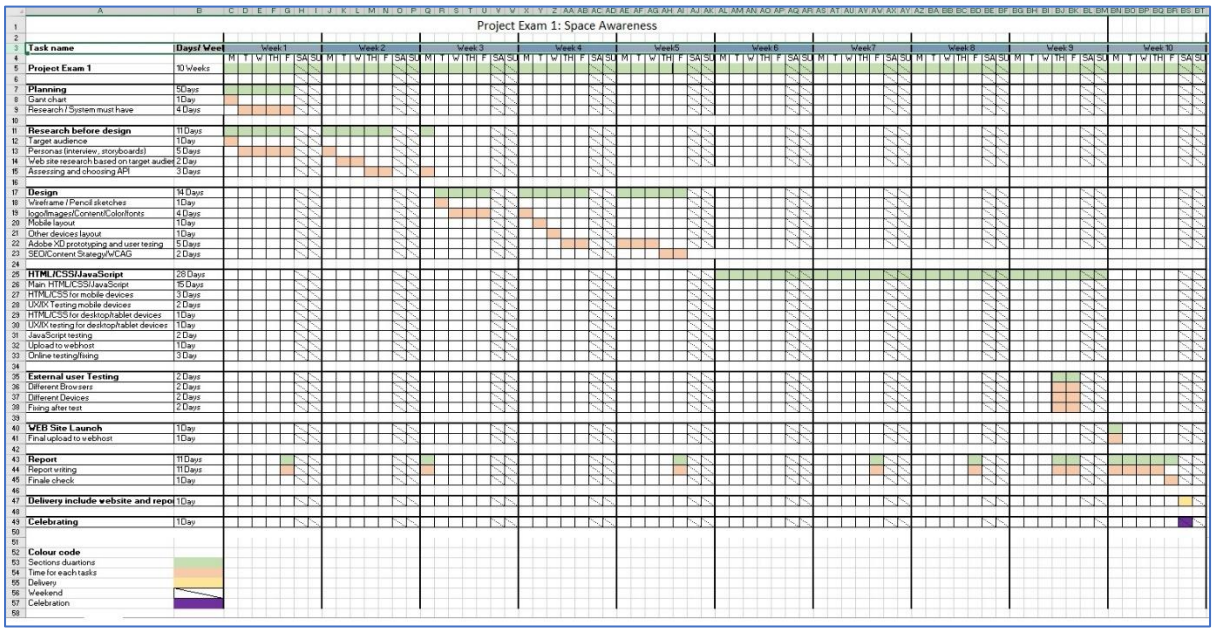
2.2. Reflection

2.2.1. Planning

The project starts with assessment of the assignment and planning of the project. I use a Gantt chart to visualize the project plan.

2.2.1.1. Gantt chart:

In this project, I am doing work schedule planning in a Gantt chart with submission on May 9th. I start by planning for the whole project and do it by making a Gantt chart in excel. In Gantt chart, I create a task for each main item I need to complete in the project. I have defined 9 main tasks with subtasks that describe which elements are defined in the Gantt chart. This I have distributed over 10 weeks. I use color codes to mark each task in the Gantt chart. I use the Gantt chart to keep track of what parts of the project are being in progress, how much remains and what needs to be done to get the project completed. Full Gantt chart is attached.



2.2.2. Design

In this project exam1, I am asked to create a micro site about space technology to raise awareness about space program activity around the world. I have decided to create this page for a target audience youths between 15-25 years.
I started the design process by visiting various sites focusing on technology and space exploration to get a feel and understanding of the theme.

I also visited sites with focus on young audience to better understand how they consume web content.
I further created some personas with profile and scenario to reflect on my target audience. My next step was to decide for what content the site should focus on and how this could match the target audience, and after this I made a first pencil sketch to outline ideas and wireframing.
To test the site, I created a simple prototype in Adobe XD. This prototype is only for the first page on the site, and mainly focus on how my test users would use the page and navigate.

2.2.2.1. Research

I started my research by looking at several webpages focusing on technology and space exploration, and web pages targeting younger audience. To observe how the pages work when searching and if the pages are user friendly. While studying these websites, I started outlining guidelines for interview and contextual inquiry that would form the base for my persona's development and storyboards for those personas.
The personas are made to reflect on the target audience for the final website, and the profile and scenario for those personas have been important to form ideas about the website's functionality, looks and feel.

2.2.2.2. Target audience and Personas

I early decided to create the site for a youth below 25 years. Users as young as this are normally very experienced users of internet resources and thus have few problems finding around on a site that is sensible and logically structured. furthermore, it is the case that younger users become more motivated and curious if a web site contains a lot of pictures, videos, and links rather than a lot of text. users in this group will quickly leave the page if it is not catchy and appealing.

Personas

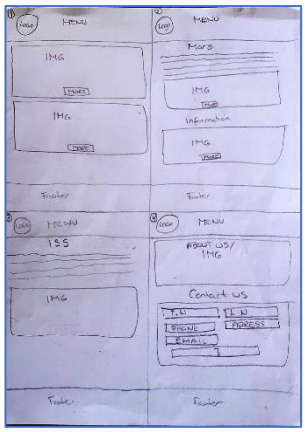
Personalia	Profile	Scenario
Name: Benny Age: 24 Relationship status: Same sex partner Profession: Builder Interests: Fishing, mountain hiking and family.	- Busy with his work on weekdays - Spent time with his boyfriend and goes fishing and mountain hiking at the weekend. - Not found of website with much text on - He is a handy man, no interest in technology but is a great fan of Star Wars and all space related movies.	Benny is struggling with reading difficulties. He does not like web pages with too much text. In order not to lose interest, there must be pictures and videos that are easy to understand the meaning of.
Name: Malin Age: 21 Relationship status: Single Profession: IT consultant Interests: Gaming, technology, cars, friends, and dogs.	- Successful in her job, work late evening in weekdays and often work in weekend. - In her spare time, he spends most time gaming with friends and explore new technology. She also loves driving around with hers highly technical Tesla 3. - She dreams of buying her own house and having a dog.	Malin use her break at work to browse the internet for interesting pages. She spends short time on each site so it is important that the site quickly can catch her interest. She is curious and likes to learn new things. Therefore, it is important that the website creates greater curiosity to desire to find out more.
Name: Gard Age: 19 Relationship status: in a relationship Profession: Student Interests: Gaming, Friends, and girls	- Dutiful in school and his goal is to become an ambulance driver. - He spends his spare time mostly with his girlfriend and gaming with friends. - He also looks forward to getting his own driver license and buy a motorcycle.	Gard is a student not to be afraid to read on web pages if he finds the page interesting. He is concerned that it is not "fake news" and would like relevant and evidence based information.

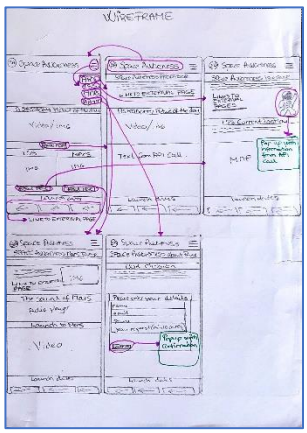
2.2.2.3. API selection

As part of research for this assignment I was studying the API's that was supplied in the External resources. I quickly decided I would use API that could give information about the ISS current location and astronauts currently in space. This type of information can be appealing to younger audiences. The API for this is OpenNotify at http://open-notify.org.
I also had decided I would focus on the NASA activities and therefor it was naturally to use the NASA APIs supplied at https://api.nasa.gov/index.html.
The OpenNotify API does not require any registration to use and has very few API inputs, so it is a straightforward API to work with.
The NASA API on the other hand require registration for us. So, I had to first register as a user to get my API key. Furthermore, those API's have a many routes and resources so there was need to use some time exploring those API's to understand what information they could provide, and how to use them. For this I used the documentation on api.nasa.gov and used Postman to further explore and learn the API's. I finally decide to use the APOD route from the NASA API. Further in this API's I could not find an API giving me information about planned launched. I could manually create a schedule from provided resources, but that would be static information that quite quickly would be obsolete. Therefor I did search for API's that could provide the information I needed, and I found it at the https://thespacedevs.com/. They offer many APIs, including Launch Library 2 which includes information on past and upcoming launches.

2.2.2.4. Pencil Sketch and Wireframe:

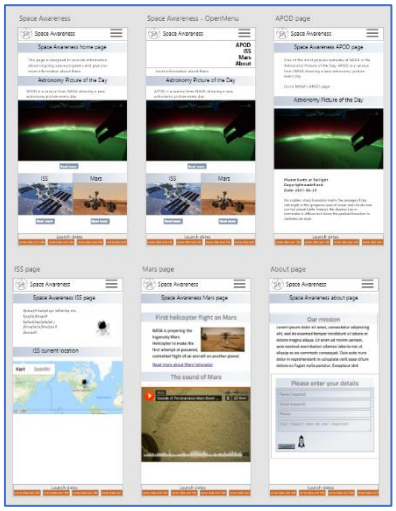
After I had decided for API's to use, I started to sketch out the web site as a pencil sketch outlining my main ideas how the site should be. While working on the design, content ideas and wireframe the pages changed some from the Pencil Sketch. The wireframe is a quite accurate representation of the final result.





2.2.2.5. Prototype

To test the site, I created a simple prototype in Adobe XD. This prototype is containing several pages, but navigation is only complete for the first page on the site. The prototype mainly focus on how my test users would use the page and navigate. The other pages have a design similar to what the final web site will have, but navigation on these pages is only back to the first page. I created my prototype based on a mobile artboard which is 411x823 pixels. The prototype is based on the pencil sketch, wireframe, and other design work I have done before prototyping.



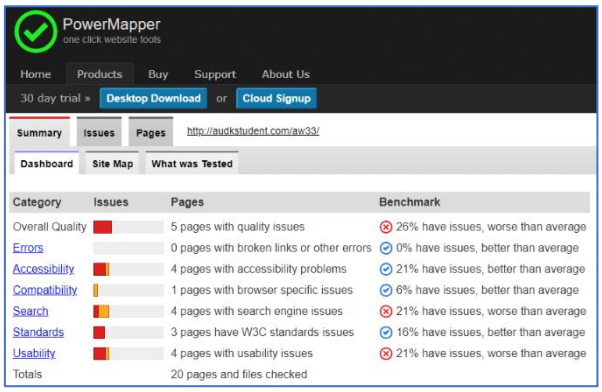
Even if the prototype was mainly for testing user's navigation on the site, I also used the prototype to design the final look on the web site.

Since the prototype I have created is mainly to learn how the users interact with the web site I created all the pages I would need and had limited navigation on all pages expect the main page. What I learned from observing my test users interact with the prototype was important for the result. Originally, I had some "Read More" buttons beneath each section and I had intended for users to click on that button to go to navigate to the next page. But I quickly realised that for most users it felt more naturally to click on the heading or on pictures in the section to navigate. Therefore, in the final web site I included the same navigation links there as well, but also decided to keep the "Read More" buttons. I also noticed that some users did not realise the footer is interactive. I therefore changed the footer heading text to "Upcoming Launches. Click below to get more information" to make sure all users actually understand that the footer is clickable.

2.2.2.6. WCAG and SEO

During the design of this site, I have taken into consideration WCAG principles. I have ensured the site is easy to navigate and easy to perceive for the users.

I used a 3. party (powermapper.com) tool to WCAG test my site, and this led me to several minor changes. The test recommended to have a Home link on all pages. Even If I already had this home link at the logo and site title, I decided to add a Home selection in the menu as well.



I have made sure that there is consistency in the use of <h> tags so that the page is more easily accessible users who have accessibility needs due to disabilities.

Also, to benefit those users I have been careful to use ALT text for images, and using descriptive title on all pages. These features are also benefitable in terms of SEO.

Further to improve SEO I also ensured the title and description is of good quality and is related to the page. Further WCAG tests showed me that I had to adjust some colours for better contrast and visibility.

2.2.2.7. Colours, fonts, and images:

I have selected colours that are minimalistic, fits the theme of the site and make it attractive for the users. I have also had in mind contrasts so it should be easy to read and easy to perceive for the user.
The fonts are select to be easy to read and to look modern and nice on the page. When selecting the fonts, I make sure that font and colours meet the requirements of WCAG. The fonts are not to be expected to exist on the users' devices, so I have included them in the CSS stylesheet.
Most of the images are originally too large to be used for a web page, so I have used Adobe Photoshop to adjust the sizes. All the images I have size adjusted to under 200kb.
For images downloaded using API calls I have of course not been able to change size, but I have used the API link to the smallest version of the image.
For this assignment I created a simple Logo I Adobe Illustrator. I created it as a PNG file without background so it is better to use wherever I would like to use it. I also converted the .png file to a .ico file with size 16x16px for use as title icon.

2.2.3. Programming and testing

Programming parts consists of HTML, CSS, and JavaScript.
I started building html skeleton for my pages. I have used the same HTML framework on all pages, this makes programming and maintenance easier and clearer, and it also makes it easier for others to understand my coding. As always when I am coding webpages I do it with Mobile First approach in mind. This is because most web users, especially in my target group are consuming most of their web content on handheld devices like tablets and mobile phones. I also follow the principles of responsive design so that most of the elements on the web page does not need to be adjusted with media queries, however, some adjustments with media queries will be needed.
Testing has been done in several stages. I have done the first tests myself, but as the project has progressed, I have involved external users for testing. They have tested the various elements on a variety of devices and web browsers.

2.2.3.1. HTML

The HTML skeleton I am using for all this page contains <head> part that is mostly similar for each page. There are only variations in content elements title, description, and keywords, but these elements are important to customise for each page for better SEO score.
Further all pages consist of a body which are divided in header, main and body. The header contains all navigation and is build up in a separate html file which I insert in the page with JavaScript. By using this method, if I need to do changes to the navigation menu or other elements in the header, I only need to do so in one file. The main part is again divided into several sections, some sections using JavaScript to build the content, others with all the content included in the section. The footer is mainly being build up with JavaScript.
During the coding process I have been consequent with use of Headers to make the site better in terms of WCAG, and I also have been careful to ensure all images having ALT text. For some images being extracted from API calls, ALT text will be missing in cases where the field in the API query is returning an empty value.

2.2.3.2. Mobile layout and media queries

In this task I have been design for mobile first, but also had in mind responsive design that will work well on all screen sizes and formats. To make the page as responsive as possible I have mostly used relative values like % and em when setting sizes, paddings, margins etc. Since I am designing for Mobile First, all styling not embedded in some media queries are adjusted to mobile screen.
I have used Chrome DevTools to test the view for different screen sizes and used the DevTools function for mobile simulation. Here I have tested by selecting different mobile devices. In the style sheet I have defined several media queries different with trigger points based on screen with.

2.2.3.3. CSS

All styling in CSS is done with Mobile First and responsive design in mind. Necessary font-faces has been defined to ensure fonts used on the web site will be displayed correctly even if they are not available on the user's device, and media queries has been defined for different trigger points.
When I first created the site, I soon realised that some element needed some measurements to add affordance to it so the users should understand the element had some functions attached to it. One of the elements is the astronaut on the ISS page. When displayed on desktop a mouse over will show that this element is clickable, but on a mobile device it is not so obvious, therefor I decided to add some animation to the element to attract the user's attention. This required some experimenting with the animation before I was satisfied with the solution. I got my test users to do intensive testing on different devices to reveal issues with scaling and formatting. This showed there was a need to make mediaqueries also for devices with slightly unusual screen resolution.

2.2.3.4. Javascript, API and DOM

In this assignment JavaScript, API calls and DOM manipulation has been especially important and most of the site is dependent on this.
I use JavaScript in the header to handle clicking on the hamburger menu, and I am using JavaScript to import the header.html into each page.
I also use several API calls in this assignment, for some of those API calls I needed to register with the API owner (NASE,Google) to get a API key, but other API's can be used without registration.
When I am building functions in JavaScrip I strive for them to be reusable so the same script can be used for related purposes at the site.
An example of this is the function "launches(id,launchId)" which takes two parameters. With these parameters I can use the same function for both building the launch timeline in the footer, but also displaying detail for a launch when the users click on them. In detail I uses the ID to identify the correct element In the HTML code and as input to IF statement to decide if the function should build DOM for footer list or for details. For the details I also uses the second parameter to identify the correct launch instance the user has clicked on.
I also had to do some studies on how to implement google map in my code, and I see there are a lo of customisations and adjustment possible when using google map. For this assignment I chose to keep it quite simple since it my first time using the map element.

When working with JavaScript I reuse a lot of my own scripts I have been writing earlier. Some of those script I can use as is, but others I had to customise for new use. I also had to write several new scripts for handling the API calls and DOM manipulation, and write new scripts for functions I have not had earlier.

2.3. Conclusion

This Project Exam has resulted in a web site with a total of 7 html pages, one CSS file, one JavaScript file and this report. During this project I has learned a lot of new features, both in HTML, CSS and especially in JavaScript and DOM manipulation. The project started with planning, and has gone through phases for research, design, prototyping, programming, and testing before final deployment. The relevant files have been gathered in a GIT repository, and the final web site has been published at my web host.

3. References

Images : pictures, images, movie and sound from :
https://www.nasa.gov/
https://www.pinclipart.com/
https://mars.nasa.gov/
https://soundcloud.com/nasa

Fonts : free fonts from 1001freefonts.com
https://www.1001freefonts.com/

Various information from available lessons and pensum books, earlier assignments, https://www.w3schools.com/ , feedback from teachers and tutors on earlier assignments deliveries, help pages for Adobe Photoshop and Illustrator.

API information and documentation from:
http://open-notify.org/
https://api.nasa.gov/index.html
https://developers.google.com/
https://thespacedevs.com/

4. Acknowledgements

In this project exam I have learned more about working systematic in a project from start to Finnish. I have got more training with planning in Gantt chart, working with Adobe XD prototyping, working with defining target audience and creating personas for the project. I have learned a lot about JavaScript, API calls and DOM manipulation. I have learned that thorough preparation before the work on the project itself starts is important, and I have experienced how challenges will arise, and how changes must be made to meet them and how this can affect plans and create challenges for deadlines and milestones.
I have again seen that thorough testing on various devices and browser is especially important so that the pages work on the different devices and browser users may use.

5. Appendices

Link to the finished web site : https://audkstudent.com/aw33/