A picture containing logo

Description automatically generated

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| School Of Computing and Informatics |
| Website Design and Development |
| Assignment 1 |
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# DNS

## Types And Purpose Of DNS

DNS (domain name server) is usually a global server that people access to get IPs instead of the domain names, so they can access the websites their looking for, this way people don’t have to memorize the ip of a website to access it they only memorize the name and access the website through the domain name servers, DNS server work when a person enter a name of a website into the web browser the browser sends a request to a DNS server and for this process there is multiple parts some of them are:

1. TLD name server

2. cashing

TLD:

top-level domain is the last part of a domain name such as .com .org .net .edu there are 3 types of TLDs

1. generic: these include well known domains like .com .net .org .tech

2. country code: these represent specific countries such as .uk .jp .jo

3. sponsored these are specialized domains for educational institutions .edu or government websites .gov

cashing:

to improve efficiency, DNS results are cashed at many places (servers , browsers) so that repeated requests for the same domain can be handled faster

DNS lookup process:

the start: the user out the desired website in the browser then the browser needs to find the right ip for this website

check browser cache: the browser check if this ip is available in its cache database this happens because they user might have entered this website before in case this doesn’t happens we move to the next step

check OS cache:

the operating system cache checked next if the ip is found the website will open if it doesn’t we move on to the next step

DNS resolver

the dns resolver usually provided by earthier you ISP or third party DNS service like google

the DNS check on its own cache to see if the ip is available there if it is still not found we go to the next step

query root dns server:

the dns resolver then queries one of the 13 root DNS servers, these don’t have the ip for websites but can direct the server on which TLD to go to

TLD DNS server

when the correct tld found it start to search then its search in its own authoritative DNS server for this IP then the authoritative server return the ip to the browser and which can then load the website

after the website ip’s has been found both the DNS and the browser store it in the cache.

## How Domain Names Are Organised and Managed

There is a structure that all domain names follow this include multiple levels

* root level: root level is the highest level of DNS structure and its maid by on of the biggest organizations in the world (IANA) and its the first part of the domain name
* top-level: the top-level which I talked about above (TLDs) which comes after the second level.
* second level: the second level they are chosen by the organizations that makes the website for example [www.facbook.com](http://www.facbook.com/) the Facebook is the second level.

# Communication Protocols, Server Hardware, Operating System, And Web Server Software

## Communication Protocols Definition

Communication protocols are rules and standards that determine the format and transmission of data. Those protocols can be implemented by hardware and software or one of them, those protocols different systems can communicate with each other

## Relationship Between Protocols, Hardware, Operating System, Web Server Software

Os: the os manages the hardware resources and provide a platform for running services and application

web server: are specialized software (sometimes special hardware for it) that deliver the content to the clients

relationships:

there are many relationships between all of theses softwares and hardware

protocols and hardware: the hardware executes tasks defined by protocol like data transmission

protocols and OS: the OS operates and manages many protocols for example network protocols to allow applications To use them for communication.

OS and hardware: the OS controls and manage hardware resources to ensure that netwerk interfaces, memory, CPU, and storage are used efficiently to support network communication and other tasks

OS and web server: the OS provide an environment where web servers run, where the OS manages the servers hardware and resources and network communication to ensure the server can handle requests file management and process data

web servers and protocols: web servers uses many protocols to interact with the clint like http and http these protocols and responsible for the way our requests and responses work enabling our web content to transfer over the internet

## Purpose And Relationship

Communication protocols define the rules and conventions for data exchange between devices over network. They ensure that data is transmitted accurately and efficiently, which allows us to communicate with each others in ways we couldn’t imagine before.

Other then the http and https mentioned above there are more communication protocols like FTP, TCP/IP, those play major element of how websites work: when you access a website your browser uses HTTP/HTTPs to request web pages and web apps from the servers these protocols ensure that the data sent and received correctly and matched between the Client and server

## Relation To Designing, Accessing, and Publishing the Website

We mentioned above the role of communication protocols in the websites here is the others that play role in websites

server and server hardware: the server is responsible for hosting and storing the website and its information and its hardware responsible for handling incoming requests, running the necessary software ensuring that the website load quickly and can handle high traffic

OS: the OS ensure that w\the web server software runs smoothly and efficiently it also provide security features to protect the server from unauthorized access and attacks

# Website Development Technologies, Tools, Techniques, And Frameworks

## Website Development Technologies

Website development involves many technologies to create and maintain a website and to make interactive and visually appealing depending on the developer needs they can use verity of technologies

## Available Website Technologies

There are many website technologies available and here is some of them and a quick brief about them:

1- browsers: web browsers are software applications that allow users to access and interact with websites and webapps, they display HTML, CSS, JS which provide the user with a graphical interface to view webpages.

2- html css: HTML is a markup language and its the standard language to create a website and its structure its unique with its elements like links images tables and more

CSS is a style-sheet language used to control appearance of the html elements, which allows developers to control the layout, colours, fonts and other element of the html

3-programming languages(JS PHP python java C#): programming languages are a tool to allow developers to write a code to dictate the computer on how to preform tasks in web development there are two categorize for them:

1.front end: those languages like JS run in the browser and handle the client side logic they are responsible for the interactive elements of webpage.

2. back end: these languages such as php, python run on the server and manage the application core logic and data processing and the interactions between the database and the front end they handle requests from the front end and delivering the appropriate response

4-database(mySQL, oracle ,SQL server, mongoDB): databases are systems used to manage and store data they are essential for any application to that handle data and they are categorized into

1.relational databases: these use tables to store data in rows and columns with relationships between them defined by keys they they are based on SQL for managing and querying data, they are ideal for predefining schemas.

2.noSQL database: they are more flexible then RDB and can store unstructured or smi-structured data, they are designed to be more dynamic and handle large amount of data.

## Technologies Used to Design, Develop and Manage Your Website

I used a verity of technologies including the essential ones above here is what I used and how:

1- HTML: I used HTML to introduce the main structure of the web app and to prepare the main structure to handle the functionalities I wanted to introduce to this web app I used many elements for the HTML(header, head, form, footer, nav, img, a link, labels, inputs, buttons and more) each of those elements played a vital rule in building the webapp in mind.

CSS: I used the CSS to make the the HTML elements more presentable and more appealing to the user and to organize all the elements together to create exactly what I had in mind or what I did in the wireframe.

JS: my use of the JS wasnt much but I added it to my website to make sure the input of the user match what he (the user) should put in the fields  
php: I used php a lot to prepare the webapp for the introduction of the DB I have used it to save the user main info so the content would be for each user as necessary and I used it to prepare queries for the program to send it to the DB and I used certain triggers to send requests

DB: I used the database to enable the website to turn into an webapp and to save the login or sign up credentials of each user and to save their bookings and their see their previous bookings

I also used both php and DB to enable the user to use CRUD operations (create, read, update, delete ) where the user can create reservations, read previous ones, delete or update them if needed.

## Website Development Tools

## Available Tools for Website Design and Development

There are many website design and development most popular ones are:

1- code and text editor: these tools are used to write and edit the HTML, CSS and JS code that form the structure and functionality of website like Vscode, atom etc

2- developer tools of the bowser: the developer tool is a built in too by the browsers that allow developers to inspect and debug the HTML CSS and JS code of the website, and it sallows for the developer to see network requests, console for JS and more

3- tools for wireframe and sitemaps: these tools help in creating simple visual representations of the website’s structure and layout before the coding stage begins, wireframes show the basic layout and content placement while sitemaps outline the order of the pages

4-google search console: a free tool by google that helps website owners monitor their websites performance in google search results, which allows developers to improve their website to reach more audience

## Tools Used to Design and Develop Your Website

1- code and text editor: for my webapp I used Vscode as a text editor because its easy to use and has a hug amount of extensions to make the life of a programmer easier like live server to lunch the code at internal server to see the results of the code, auto rename tag to change the close tag when I change the open tags and more extensions to be useful for web programming

2- developer tools of the bowser: I relied on the developer tool on the browser whenever I had an issue and I couldn’t tell by looking at the code what the issue is I usually would check for errors in the developer tool if isn't one I would rely on it by using it to see which tag exactly that is causing the issue it helps identify your tags positioning and to know where each tag end and where it begins.

3- tools for wireframe and sitemaps: I used many tools for wireframe and site map I created with the tools a wireframe for the website and for the mobile version and used a tool to make the site map as it is in the design document some of these tools are: moqups, wireframpro

4-google search console:

this tool has been valuable for my web app improvements by going through the data it provided I can go through them and analysis them to a very valuable data the can lead to more exposure for my targeted audience and improve the ranking in the app

## Website Development Techniques

## Available Techniques for Website Design and Development

There is many techniques for creating and schools of techniques where each one provide a certain aspect of the website to improve:

1- responsive design: this technique has evolve to a mandatory for most websites because of the verity of devices users use where each device has different size for its screen and the website must look appropriate for each one

2- good navigation: a well structured navigation system is crucial for guiding users through a website, so the user can go through the website pages easily without having to much trouble identifying how to navigate to each page

3- colour palette: the colour palette chose for a website can impact the overall aesthetic and user perception for the website, because a bad colour palette can make the user have the urge to leave the website specially if the colours of the website can be “annoying” to the user, additionally each category of websites have its own colour palette where for a website has to follow the systematic colour palette for its own category to improve its user experience

4- SEO techniques: search engine optimization is very important for a website to reach a large audience or a targeted audience group so the website futile its goals

5-percentage/em/rem instead of fixed units: using a flexible units like those mentioned over fixed units can be highly helpful in turning the website from static sized to responsive and increase scalability in the web design

there are many techniques other than those ones with a lot of people choosing their own programming style to serve their prearticular use for the website

## Techniques Used in Your Website

I used most of the of the techniques mentioned above because they are essential techniques for website development here is some ways I used those techniques in:

1- responsive design: as I was coding the website I put an effort to make the website adaptable for multiple device and maid so it would break the website structure if the size of the page or screen changed by keeping the elements simple and making the web app built on dynamic sizing not a static one where I tried to not use any fixed position to any of the website elements

2- good navigation: in the process of creating my own web app I tried to balance between a good navigation where a user can easily access all the pages and between authentication where a user goes only to the places he is allowed to go as well as keeping the design simple not too complicated and I think I did good balancing those things in my web app.

3- colour palette: at the start of the coding stage I went on a research journey to find the appropriate colours to choose for my webapp, where I identified the webapps category and found the best colours for these category then I proceeded to picking a collection of colours that goes well with the colour I chose before landing on a group of appropriate colours for the webapp.

4- percentage/em/rem instead of fixed units: in my webapp I tried to use those units as much as I can to make the transition to responsive design as easy as I can but in some cases I used the px unit where I needed it to be precise but overall I accomplished most of the webapp units without using px too much.

## Website Development Frameworks

## Available Frameworks for Website Design and Development

There are many frame works available for website development and they are divided into 2 categories front-end and back-end and here is some of them

front-end:

1- bootstrap: a popular framework that helps developers to create responsive websites quickly, it includes pre-designed components like navigation bars, buttons, forms and grids

2- react.js: a java script library developed for building user interfaces, especially single-page applications.

3-angular.js: this is also a JS library developed by google for building dynamic web applications. It allows developers to use html as a template language.

4-font awesome: is a toolkit that provides a scalable icons and social logos for web projects without worrying about image files

back-end frameworks:

PHP: a server based scripting language designed for web development, is is widely used for creating dynamic and interactive websites (webapps)

python: a programming language that is widely used in web development through frameworks, python is know for its simplicity and readability

java: a powerful object oriented programming language that is widely uses in enterprise level applications.

## Frameworks Used in Your Website.

I used many frameworks in my own webapp and here is what I used:

1- bootstrap: I used a cool looking effect called spinner-grow I took from the bootstrap it a visual aid to improve UI and to guide them to the main link in the home page

2- PHP: I used the PHP language for the server to prepare and implement and handle data from and to the database

# Search Engine Optimization

## Search Engine Optimization Definition and Purpose

Search engine optimization (SEO): its the process used to optimize a website technical configuration, content relevance and link population so its pages can become easily findable, more relevant and popular towards user search queries and this improve the search engines rank for the website, which allows the website to reach its targeted audience

## Indexing Definition

Indexing: this is the process maid by search engines to discover, analyse, and store web pages in their database, after the pages has been indexed, it becomes eligible to appear in search engine result pages when users search for relevant keywords

## Techniques For Improving the Ranking

There are many techniques to improve the website ranking on search engines:

1- choose a great domain name: choosing your domain name is crucial for a website where is need to be bendable, memorable, and relevant to your business, using a domain that includes a primary keyword can also provide a slight SEO advantage

2- research the right keywords: this step is also important for the website where you research the important keyword for your targeted audience and ones which are relevant to your content, that will help to attract the right audience to the website

3- title tag and meta descriptions: you have to make sure that each page has a unique title tag and meta description those elements appear in SE and can impact the rank and the click rate

4- header tags: using header tags for the content makes it easier for SEs and users to understand the content for the website and this makes the target audience reach improve

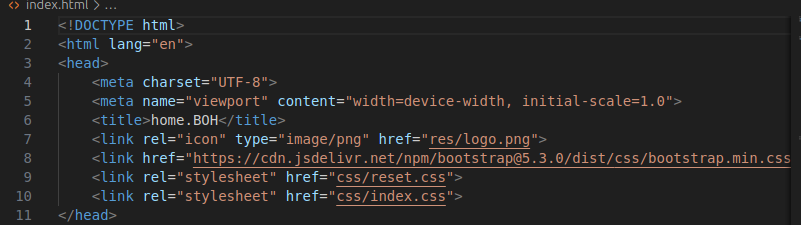
5- mobile friendliness: with the use of mobile smart phones having a website with a good design for mobiles would improve the SEO of the website.

6- using https over http: using HTTPs is better for the website securty but its also a favoured protocol for the SEs

## Evidence For the Used SEO Techniques in Your Website

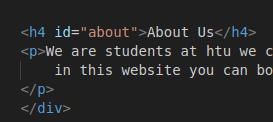
I used many SEO techniques here are some of them:

title tags and meta charset and viewport tags:

as you can see in this picture I used those elements in my home page code as well as in the other pages

the impact here is that title tags are crucial for SEO they appear in SE results and are ib if the first things a user sees how ever its better to use titles which describe the pages and to have them with a unique and descriptive title in my code I did make them unique and include the brand of the website but I didn’t provide a description in them

as well as using a logo can improve the branding recognition and improve user experience which might improve the SEO but not directly



using a header tags is very important for SEO it would make the software recognize the page contents

# Front-End And Back-End Website Technologies

## Front-End And Back-End Definition and Related Technologies.

Front-end definition: the front-end also know as the client-side refers tot the part of the website or web application that users directly interact with, it includes everything the users sees such as layout, design, text, images, buttons, and navigation menus

back-end definition: the back-end also know as the server-side refers to the part of the website or web application that handles the logic, database interaction, user authentication, and server configuration and server configuration, it orates behind the scenes and is not directly visible to users

related technologies:

front-end

js: java script is a scripting language executed in the browser that manages clit-side logic and creates interactivity on the web pages it is responsible for generating energetic content, validating input, animations and more

back-end

PHP, python and others: these programming languages operate on the server it handle the main application logic, data processing, and database interactions through processing requests from the front-end and return suitable responses, to support the back-end functions of the websites and web apps

## Presentation And Application Layers Definition.

Presentation layer is a concept that includes everything related to the visual presentation and user interface of an application, in the web context its is closely aligned with the front-end

application layer the concept of functions and logic that power the application this layer responsible for processing user input, executing logic accessing data from the database and passing the data to presentation layer

## Relationship.

front-end and presentation layer

the front-end is a specific implementation of the presentation layer, the presentation layer is a wider concept which include more concepts than the front-end, it can also include templates, style sheets, scripts that define how content and data are presented

Back-end and application layer

the back-end is specific implementation of the application layer, the application layer can include more than just server-side logic it may also include APIs and other components that contribute to the functionality of the application

From the 4 definitions you can tell that basically the front-end is the presentation layer in the web context and the back-end is the application layer in the web context

WRRC (web request-response cycle)

the WRRC describes the sequence of steps that occur when a user interacts with a web application, it fucose on data exchange between the user’s browser and the web server here is how its works

1. user request

the cycle begins when a user interacts with a web application such as typing URL or clicking a link or other activities, the browser sends an HTTP request to the web server, asking for specific resource page, data, file

2. server processing

the web server receives the request and processes it this might include retrieving data from a database executing server-side code or applying logic

3. response generation

after processing the server generates http response, this response typically includes the requested resource

4. client receives response

the browser receives the response (html, css, js code) and process it this may include updating the user interface

and the cycle goes again until the user is finished with the app

3-tier architecture

it is a common architectural pattern used in web development it divides an application into three separate layers each with its own responsibility this separation of concerns improves scalability, maintenance, and flexibility

1. presentation layer (front-end):

this layer interacts directly with the user it is responsible for displaying information to the user and capture user input, this layer uses technologies like HTML CSS JS and front-end frameworks that are talked about above and it is responsible for delivering the users input to the back-end(application layer) and display the results or response received from it

2. application layer(back-end)

this middle is the middle layer it processes user inputs passed by front-end and executes rules and makes decisions based on the data this includes PHP python and other languages and frameworks and it acts as an intermediate between front-end and database (data layer) to fetch or update data and return the results and pass it to front-end

3- data layer (database)

this is the bottom layer responsible for managing and storing data, it provides access to the database where the applications data is stored examples (mySQL, Oracle) or No SQL it ensures that data is stored securely and efficiently and provides data access to the application layer

# Online Website Creation Tools VS Custom-Built Websites

## Online Website Creation Tools

Online creation tools are applications or platforms that allow the users to create websites without needing to write code those tools provide pre-designed elements and templates to use as drag and drop editors they are user-friendly making it easy for anyone to build a website without technical experience, they provide ease of use, cost-effective, support and maintenance, their limitations are limited customization since you can only use existing templates and scalability issues

## Custom-Built Websites

Custom-built websites are built from the scratch where a developer have full control over the code, these websites are designed and developed according to the specific needs and requirements of the business or the individual

## Comparison With Regards to Design Flexibility, Performance, Functionality, User Experience (UX) And User Interface (UI).

|  |  |  |
| --- | --- | --- |
| feature | Online tools | Custom-built websites |
| Design flexibility | Limited flexibility: users are restricted to the available templates and the options provided by the platform  ease of use: users can easily chose the designs from the template | High flexibility: full control over design allowing developers to make anything they desire (unlimited customization) |
| Performance | Dependent on the platform infrastructure the website may suffer if many users share the same resources | Scalability and optimized performance: can be customized for the need of the website with full control over server resources |
| functionality | Basic features the common among businesses, can add some available plugins | Supports custom features based on your needs and easy to integrates 3rd party APIs into it |
| UX | Template are designed for general usability but might not be perfect for specific users | Can be designed specifically for the target audience and very flexible |
| UI | Limited customization for designed elements but easy to use | Fully customizable UI to match the brand of the website and the requirements and allows for unique interface |

# Design And Development Process

## Website Vs. Design Document

Differences I maid between the wireframe and the finish result:

the sign up page

in the sign up page both design where maid to simplify the interface in the wire frame I added a logo in the middle and under it the name page and under that was the sign up input, but in the actual design I modified that I put the logo and the name in a nave bar and added a button for users who have an account and I added a footer with contact

the sign in page

in this page in both designs were similar to each other and I applied the same changes from the sign up page with one little adjustment in the login page I maid the corners if the sign in box rounded to give a better look and more suitable for a web app

home page

the changes in the home page were minimal I felt that the design was actually fit for the web app the only change I maid was to change the welcome sign position from then page to the nav bar I also included an bootstrap animation next the book link to take the attention of the user to that page

book page

in this page I did a few changes to it all are small changes where I removed all the links from the wireframe to add more simplicity to the page I only kept a home button and I put the name of the page at the middle of the nav bar and I removed one of the boxes that wanted an email because we already collected the email of the user in the sign up process

booking history page

in this page I applied the same changes for the nav bar as the book page and I also changed the changed the cards design I went in the website for more simple design instead of the horizontal cards in the wire frame I maid the cards in the web app more squared, but I kept them small and simple

all of those changes were maid to make the user experience better and more simple to handle navigation around the web app

## Evaluation and Analysis

Evaluation:

1- sign up

simplification and accessibility

the decision to move the logo and the page name to the navigation bar helps streamline the sign up process making the page more focused on the form itself

enhanced navigation excluding the links that the user can use until he is logged in and adding a link for the login page improves accessibility and security making simple to move for users

adding a footer with contact improves professionalism and offers direct way for users to reach out if the encounter issues which improves UX

2- the sign in page

ensuring that both the sign in and the sign up have consistent look and feel is important for the web app and provide consistency to the design

rounding the corners of the sign-in box gives the page a modern and user friendly appearance making it more appealing for a web app and adds a aesthetic look for the page

3- home page

the minimal changes reflect confidence in the original wireframe design and indicates that the design was well suited for the web app page

the bootstrap animation added is a strategic addition to guide users attention to the booking feature which is the primary function of the app

4- book page

by reducing the number of links the page becomes easier to navigate focusing the user on the booking process which streamline navigation for the user, additionally removing the email input reducing the steps that the user has to go through eliminates unnecessary steps making the process more efficient

5- booking history

the changes for the navigation bar in most of the pages gives the web app consistency across multiple pages ensuring a cohesive user experience

the change for the cards design contributes to a cleaner and more organized interface which aligns with overall goal of simplifying the user interactions

analysis

* sing in

the original wireframe focused on placement of the logo and the name prominently which may have taken a space from the main purpose of the page by moving those elements to the navigation bar in the final design I prioritized the sign-up process itself reducing unnecessary distractions

the added button for users with existing accounts anticipates user needs allowing for quicker navigation, this change reflects a thoughtful consideration of different user scenarios enhancing the overall usability

* sign up

the changes maintain design consistency across pages which is crucial for seamless user experience the rounded corners soften the visual impact making the interface appear more modern and user friendly the small changes might seem insignificant but can be a great affect for user perception

* home

the bootstrap animation is an example for strategic design choice aimed at enhancing user interaction by drawing attention to the most important action (booking)

* book

the removal of the email input box reflected reduction of redundancy as well as removing the multiple links to add more simplicity to the page without hurting the accessibility for the overall web app as asking for information multiple times can be frustrating for the user

* bookings history

the shift for the cards design adds visual clarity and improves usability and emphasizes simplicity this change helps the user to scan and understand information quicker aligning with the overall goal of user-friendly app

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# Declaration Form