Activity A (ii)

Produce a detailed proposal for a digital solution that you would develop to meet the needs of:

- the client (Riget Zoo Adventures)

- existing and potential users.

Your proposal should provide a rationale for the solution you are proposing and include:

- the business context

- the functional and non-functional requirements of the solution

- decomposition of the problems that will need to be solved to implement the functional and non-functional requirements

- the key performance indicators (KPIs) and user acceptance criteria for the proposed solution

- a description of the proposed solution

- Justification of:

  - how the recommended solution meets the needs of the client and users

  - how potential risks will be mitigated

  - how relevant regulatory guidelines and legal requirements in relation to software development and the tourism and leisure sector will be addressed.

(24)

Summer 24: Task 1 – Proposal

Proposal report

I will be creating a project for the client (RZA – Riget Zoo Adventures) which is a digital solution that will meet their required needs. They have provided several requirements which the end-product must fulfil.

We have decided that the best way to produce this solution is through a web application. They are a modernized way of producing desktop and mobile compatible applications.

Project requirements

The project has both functional and non-functional requirements that are necessary to solve the problem at hand. I will be formatting the requirements in a table and will also decompose each problem into smaller sub-tasks.

The index is simply a short-form identifier for each task.

Priority refers to the urgency of the task, in order of:

- HIGHEST
- HIGH
- MEDIUM
- LOW

Functional requirements

Main tasks

Index	Name	Description	Priority
1	Account System	Users should be register, login to, and manage accounts. Doing so will enable users to manage their bookings.	HIGHEST
2	Booking System	Users should be able to reserve tickets for the zoo. They must have an account to manage their bookings.	HIGHEST
3	Hotel System	Users should be able to check availability for and book stays at the hotel.	HIGHEST
4	Help & Information	Users should be able to get information about anything they should need whilst at the zoo; attractions & facilities, for example.	HIGHEST
5	Educational Resources	Users that are visiting for educational purposes should be able to acquire materials which will support their visit. This could include guides, worksheets, interactive content, presentations, etc.	MEDIUM
6	Accessibility System	Users should be able to alter accessibility options which will support a wide range of users.	HIGH
7	Loyalty & Reward (Membership) System	Users should be able to earn points over time by completing tasks set to them. They will be able to redeem these points for cool rewards.	LOW

Non-functional requirements

Index	Name	Description	Priority
1	Accessibility	Users should be able to use a small widget which will configure the overall appearance of the site, such as font size, font family, colour scheme and more. Additionally, we will implement functionality to make the page mobile responsive, so users without bigger devices can still access the site. More justification on this is to follow the Equality Act 2010.	HIGHEST
2	Security	User data inside of the database should be securely stored and encrypted. Using a python	HIGHEST

		utility, we can hash and salt all passwords sent to our system. Also, when transferring data from forms to the backend, we will make sure to use the POST request method instead of GET, as this hides the data from the URL, preventing other people from stealing data on your screen. We are doing this to make sure we stay in line with the Data Protection Act 2018.	
3	Scalability/Maintainability	The system will be properly documented and described throughout it's development. Also, the project will be developed with proper programming infrastructure in mind, so practices such as OOP will be used where they can be. These attributes will make it so that future developers will be able to expand upon the solution in the future if they want/need to. To be scaled, the owners of the system should just need to add more servers as user demand increases. Alternatively, or simultaneously, they could increase system resources to deal with peak loads. The system will adapt.	HIGHEST
4	Ability to meet KPIs	The system should meet and show positive trends in the KPIs that have been set for it. Key Performance Indicators (KPIs)	HIGH

Risks and mitigation

Throughout the project's lifetime, there will be a multitude of risks. We must mitigate against these and reduce the risk as much as possible of there being duplication.

Index	Description	Mitigation
1	Bugs – users will find bugs whilst using the application.	To mitigate against bugs, we will do extensive testing (both automated and manual) before releasing the project to production. In the case that a user finds a bug in production, they will be able to report it to us.
2	Heavy traffic – during the applications uptime it is likely to experience higher loads of traffic as it gains more traction.	

| 3 | Users can't find what they need | Firstly, whilst still in development, we will conduct testing to mitigate against this. We will do this by giving the product to people who have never seen it before and asking them to navigate around the site as best as they can.

Having a fresh mindset is important, as a developer of the application will automatically know where everything is.

Additionally, we will implement a search function to the site, which will give users the ability to search through everything they need. |
| --- | --- | --- |
| 4 | Users can't remember the details they require to log in | Users are required to signup using their email address, so if a user does forget their email, they will be able to request a password reset to the email they used to register their account. |
| 5 | Cyber attacks | I will go over cyber-attacks in detail in the Security section of this document. |

Security

The project is likely to be subject to many different cyber attacks over its lifetime. I will state the name of each attack, a description of what it does, and then a prevention method we can use to stop this from happening.

Name	Description	Prevention/mitigation
SQL Injection	SQL Injection is where a user abuses an unsanitized input field. They can put SQL code into the field and when submitted the code will execute. This can allow a user to bypass login systems and other private areas of an application.	We will properly sanitize every single user input so that nothing like this can happen. We will input the proper checks so that invalid data is rejected and let the user know.
(D)Dos attacks	(D)DoS stands for (Distributed) Denial of Service attacks. The "distributed" is in brackets because DoS attacks can come in two forms: DoS and DDoS. A DoS attack is where lots of traffic is sent from the same location to try and bring a service offline for other users (making it unavailable and unusable).

A DDoS attack is worse, as it distributes the traffic into multiple locations. This makes it impossible to track which traffic is legitimate and which is not. | With a standard DoS attack, we can detect where the influx of traffic is coming from and block that specific IP address from sending traffic for a certain amount of time. Even then, the attackers can change their IP address.

DDoS attacks cannot be stopped, and only really mitigated. We can use popular companies such as Cloudflare or AWS Shield. Alternatively, rate limiting could be used to limit the amount of traffic that is sent to our servers. |

Legal requirements

As first outlined in the research of this project (seen in the Appendix), there are many legislations which we will have to be mindful of whilst developing this digital solution.

Applicable to every legislation, throughout the entirety of the project we will be making sure that we follow them in every way possible. The "Our actions" column outlines a few ways we will do this per-legislation.

Legislation	Meaning (summary)	Our actions
Data Protection Act (2018)	Aligns with GDPR and incorporates UK-specific regulations. Protects against; misuse of personal information, unauthorized access/sharing of data, loss/theft/exposure of sensitive information.	1: We will be hashing and salting all passwords sent to the database to be saved. This ensures that if someone does manage to gain access to the database, they won't be able to read any of the passwords. 2: When users submit forms such as registrations or logins, we will make sure to use the correct HTTP method that will not show the data in the URL (which is POST).
Equality Act (2010)	Protects individuals from discrimination, harassment or victimization. Characteristics that are protected: age, disability, gender, marriage, pregnancy, race, religion, sex, and more.	1: We will be aiming to meet the Web Content Accessibility Guidelines (WCAG 2.1), as it is a widely accepted standard for web accessibility. 2: We will be adding an accessibility widget which will allow users to make changes to the site however they prefer. For example, font size/family, colour scheme, etc.
Health and Safety at Work etc. Act (1974)	Governs workplace health and safety. Ensures health and safety of all employees at work. i.e. Safe equipment, environments. Regular risk assessments, etc.	1: The information on the website must be checked regularly to make sure it is factual and up to date. People may use the information on the website when they come to the zoo, so it must not contain anything harmful.

Key Performance Indicators (KPIs)

Key Performance Indicators (KPIs) will be used to track performance of the digital solution. They are vital to inform decision making for both the company and our development of the project.

Technical

- Website traffic
  - Measures the number of visitors and how often they visit.
  - High traffic indicates the site is discoverable and visible and is being effectively marketed.
- Page load speed
  - Measures the time it takes for the website to load.
  - Faster load times improve the user's experience and keeps the user on the site for longer. Slow times push users away very quickly.
- Uptime
  - The amount of time that the site has spent being online and functional.
  - High uptime allows users to access the website consistently. Allows users to rely on the system.

Business

- Registration rate
  - The number of new registrations that have been made on the site.
  - Gives a good indication of how good the site is at convincing users to sign up and generate leads.
- Activity engagement
  - The number of people that are booking into events or activities in the zoo via the website.
  - Tracks which events are most popular, and which drive engagement and revenue.

User Acceptance Criteria (UAC)

According to Atlassian, User Acceptance Criteria (UAC) are the *"conditions that a product…must satisfy to be complete"*. As per that definition, we have devised a list of conditions that we think must be complete for the client and their customers to perceive the solution as complete.

Appendix

Research document.

After doing some research, I will be using four popular zoo websites for inspiration: London Zoo (https://londonzoo.org), Edinburgh Zoo (https://edinburghzoo.org.uk), Whipsnade Zoo (https://whipsnadezoo.org), and Woburn Safari (https://woburnsafari.co.uk).

Hardware and software

In this section I will be going over how hardware and software are used within the wider industry of this project. The industry is tourism and leisure.

There are many ways different hardware is used within the industry:

- Point-of-sale (POS) systems
    - o POS systems are used widely in every industry. Specific to tourism, they are commonly seen in gift shops, food stalls, or ticketing counters. They allow customers to make transactions and purchase goods they need.
- Kiosks and self-service machines
    - o Allows visitors to purchase tickets, learn information, all without the need to wait in line if using a self-service machine.
- VR/AR
    - o Virtual & Augmented Reality devices are becoming more and more common within all industries. In tourism, they are used to enhance interactive exhibits, or for virtual tours, for example.
- Surveillance systems
    - o Security is very important within tourism and leisure, so surveillance and security systems are a must-have in every scenario. Cameras are used to monitor activity, and their footage is often recorded in case an issue occurs later. Other security includes physical barriers such as lock/keycard locks.

Software

There are many ways different software is used within the industry:

- Reservation and booking systems
    - o These systems are used to manage sales related to tickets, hotel reservations, or event bookings. They will be used by both users (to book and pay for tickets they require) and staff members (to validate official tickets users are handing in to check-in with).
- Mobile applications
    - o Sometimes, places of tourism that get lots of visitors will have mobile applications developed. These applications could include lots of functionality, such as: maps & navigation, linking to booking/reservation systems, delays & opening times, etc. This is very useful for people attending as they can easily find useful information or find their way around.
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Newly emerging technologies

Virtual & Augmented Reality

An upcoming technology that has been more and more commonly used over recent years is AR (Augmented Reality) & VR (Virtual Reality).

AR is where digital aspects overlay reality. For example, someone might use an AR device, and (in the context of a zoo) see an animal, and a digital display will appear through the device which gives information on it, such as its name, place of origin, food habits, etc.

In difference, VR is a completely digitalised environment. If someone wears a VR device, they won't see the real world at all, they will only see a fake, digital world. In the context of zoos, this could be

used (in the context of a zoo) to place the user in a location that isn't immediately possible, such as in the Antarctic, in tropical regions, or even face-to-face with a dangerous species.

Internet of Things (IOT)

The Internet of Things (IOT) is creating smarter and more efficient technologies which allow more personalized experiences. In the context of tourism, there are many ways this could be implemented:

- Contactless check-ins
    - Smart devices could be used such as mobile phones or wearable devices instead of an additional item you must carry in your pocket.
- Rentals
    - Vehicles such as bikes, scooters, or even cars are becoming IoT-integrated. This allows people to locate and pay for rental vehicles all through a mobile phone application.

Some existing real-life examples:

- Heathrow Airport, London
    - Uses RFID tags on baggage allowing passengers to track luggage in real time.
- Disney's MagicBand
    - Wearable IoT device acting as park entry ticket, hotel room key, and additional payment method.

Guidelines and regulations

The following are some legislations that we are required to follow (related to the tourism and leisure sector).

- Data Protection Act 2018 (GDPR Compliance)
    - Protects personal data collected from visitors.
    - We must handle visitor data securely (i.e. purchases, memberships, etc.)
- Equality Act 2010
    - Ensures equal access and prevents discrimination.
    - We must provide accessible facilities.
- Health and Safety at Work Act 1974
    - Ensures workplace safety, including visitor and employee protection.
    - Risk assessments for hazardous activities.
    - Emergency procedures for incidents.
- Zoo Licensing Act 1981
    - Regulates the establishment and operation of zoos in the UK.
    - Zoos must be licensed by local authorities.
    - Regular inspections are mandatory.
- Animal Welfare Act 2006
    - Ensures the welfare of animals in captivity making it illegal to cause unnecessary suffering.
    - Suitable environment, appropriate diet, ability to exhibit normal behaviour, protection from pain & suffering, housing with (or away from) other animals.