

# COMP0016: Systems Engineering

## Final Prototype Deliverables and Assessment

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# COMP0016 Assessment Components Weighting

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Component Title	Weight	Submission Deadline	Led by
Coursework (HCI)(group)	5%	16:00 Wed 8 Nov 2023	Dr Chris Evans
Presentation 1 (pitch)(group)	5%	16:00 Tue 16 Jan 2024	Prof Dean Mohamedally
Presentation 2 (final)(group)	5%	16:00 Tue 19 Mar 2024	Prof Graham Roberts
Portfolio (group)	55%	16:00 Wed 25 Mar 2024	Prof Dean Mohamedally, Prof Graham Roberts, Prof Ivana Drobnjak, Dr. Yun Fu
Coursework (individual)	30%	16:00 Wed 25 Mar 2024	Prof Dean Mohamedally, Prof Graham Roberts, Prof Ivana Drobnjak, Dr. Yun Fu

# Outline for Group Portfolio (55%) and Individual Report (30%)

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1. Deliverables of Group Portfolio (55%)
  - a) Team Source Code (30%)
  - b) Team Report Website and Team Video (25%)
2. Individual Evaluation (30%)

(Note that HCI, Elevator Pitch, and Presentation 2 have separate marks)

# Deliverables of Final Submission

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- Group Portfolio
  - A zip file including three folders (code, website, and video) to **your Project Partners and Moodle**.
  - Note: the video folder includes one project demonstration MP4 file (8 minutes).
  - If your zip file is over 160M, please upload it to **Microsoft OneDrive**, save the link in a text file, and submit the text file on Moodle. Please remember to set the OneDrive sharing setting of your zip file to be 'Anyone with the link'.
- Individual Portfolio
  - Individual report of up to 5 pages, **only to Moodle**. The individual report should include your individual contribution, what difficulties you faced and how you overcame them, and an evaluation of your team members and yourself.

# Marking Procedure

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Your team TA is recording progress and achievement each week, giving you feedback as you progress. It is important that you show your \*improvements\* in your progress.

- Marking your final submissions
  - Step 1: your team TA and Dr. Yun Fu will arrange a meeting to see the demo of your project at the end of term 2.
  - Step 2: TAs will do the first round of marking by reading your report website, reviewing your code, watching the demo video to see the software/system working, and reading your individual reports.
  - Step 3: Prof. Dean Mohamedally, Prof. Graham Roberts, Prof. Ivana Drobnjak, and Dr. Yun Fu will review the marks and comments recorded by the TAs to do the second round of marking.

## 2. Source Code



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# Source Code Submission

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- The code folder should include the following content
  - A readme document to describe how to deploy your code. This readme document can be in the format of pdf. Any dependencies should be noted (and they should only be open-source dependencies).
  - Database (if applicable, and less than 100Mb). Export your database as a file and save it in the source code folder.
  - The entire source code and build files (any open-source external libraries).

# Code Assessment

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- **Your code will be assessed on**
  - Challenge of the required functionalities
  - Completion state of the required functionalities
  - Quality of your solution
  - User interface & user experience (if applicable)
  - The number of bugs and their severity levels (Critical, Major, Minor, Trivial)
  - Feedback from the project partners

ID	Requirements	Priority	State
1		Must	✓
2		Must	✓
3		Should	X
4		Could	X
Key Functionalities (must have and should have)		85% completed	
Optional Functionalities (could have)		65% completed	



# Mark Range 90–100

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- Description
  - Close to Perfect (Exceptional 1st)
- Criteria
  - A significant contribution to the field
  - An original and/or a model solution to the problem in question
  - Challenging goals and all the required functionalities are delivered
  - Close to faultless in execution
  - Results released, or ready to be released as a paper or product.
- Comments
  - This represents a really outstanding achievement.
  - The project needs to clearly stand out above others.
  - A mark in this range is hard to achieve, not impossible but certainly **rare**.
  - It needs a highly-ranked short paper, journal paper, or conference paper with your client and supervisors to be accepted for publication by the marking date (late April).

# Mark Range 80–89

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- Description
  - Outstanding (Excellent 1st)
- Criteria
  - A useful contribution to the area
  - Challenging goals and all the required functionalities are delivered
  - Only minor faults in execution
  - Results close to being releasable as a product or high-quality working prototype
- Comments
  - This represents a project that stands out as excellent in most respects but doesn't fully meet the criteria for the top range.
  - We would expect a small number of projects (5-10% maybe) to be in this range.

# Mark Range 70–79

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- Description
  - Very Good (1st)
- Criteria
  - A good outcome that has found and built a feasible solution to the problem posed.
  - Challenging goals and nearly all the required functionalities are delivered.
  - Some small faults in execution or understanding, but largely correct.
  - Capable of being released as a product with some additional work.
- Comments
  - This represents a first-class project that means most of things have been done well, but there are some faults or criticisms.
  - We would expect a number of projects (10%-20% maybe) to achieve this level.

# Mark Range 60–69

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- Description
  - Good (2:1)
- Criteria
  - A solid set of results and the main problem largely solved.
  - Challenging goals and all the must-have and should-have features are delivered
  - There are some ambiguities or faults
  - The results are able to show a feasible prototype but there are typically some limitations or omissions.
- Comments
  - A good result, that is well on the way to delivering a complete working version of the system but is not fully complete or finished.
  - We would expect the majority of projects to be at this level.

# Mark Range 50–59

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- Description
  - Satisfactory (2:2)
- Criteria
  - A partial solution that addresses most of the key issues but is not complete
  - All the must-have features are delivered
  - Project execution is not particularly ambitious, or not entirely completed
  - The results are good enough, and the basic features working, but a fair amount still to do.
- Comments
  - A satisfactory but limited result. The core features are in place but may be buggy and not that well-defined.
  - We would expect a minority number of projects to be in this range (10-20% maybe).

# Mark Range 40–49

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- Description
  - Weak (BSc and MEng Pass)
- Criteria
  - A basic solution that shows some progress but is some way from completion.
  - Some must-have features are implemented.
  - The results show that at least a solution is possible but there are significant omissions and flaws.
- Comments
  - A just about adequate project, in that it has achieved enough to get a BSc pass mark, but well below expectations.
  - We would expect no more than 2 teams in this range.

# Mark Range 0–39

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- Description
  - Inadequate (Fail)
  
- Criteria
  - The project has been run badly.
  - No working or partially working solution.
  - No solution has been identified and the group is not capable of progressing.
  - Concrete achievements are very few, and project goals are not nearly achieved.
  
- Comments
  - You have failed. Almost certainly due to lack of effort more than anything else.
  - We do not expect to have to fail any projects but will do if the results require it.

# 3. Report Website



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# Website Structure

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- Home
- Requirements
- Research
- Algorithms (if applicable)
- UI Design (if applicable)
- System Design
- Implementation
- Testing
- Evaluation
- Appendices
  - User manual and deployment manual
  - GDPR and Privacy of Data
  - Development Blog – External Link on a public site (**this should be updated every two weeks**)
  - Monthly Video

# Website Submission

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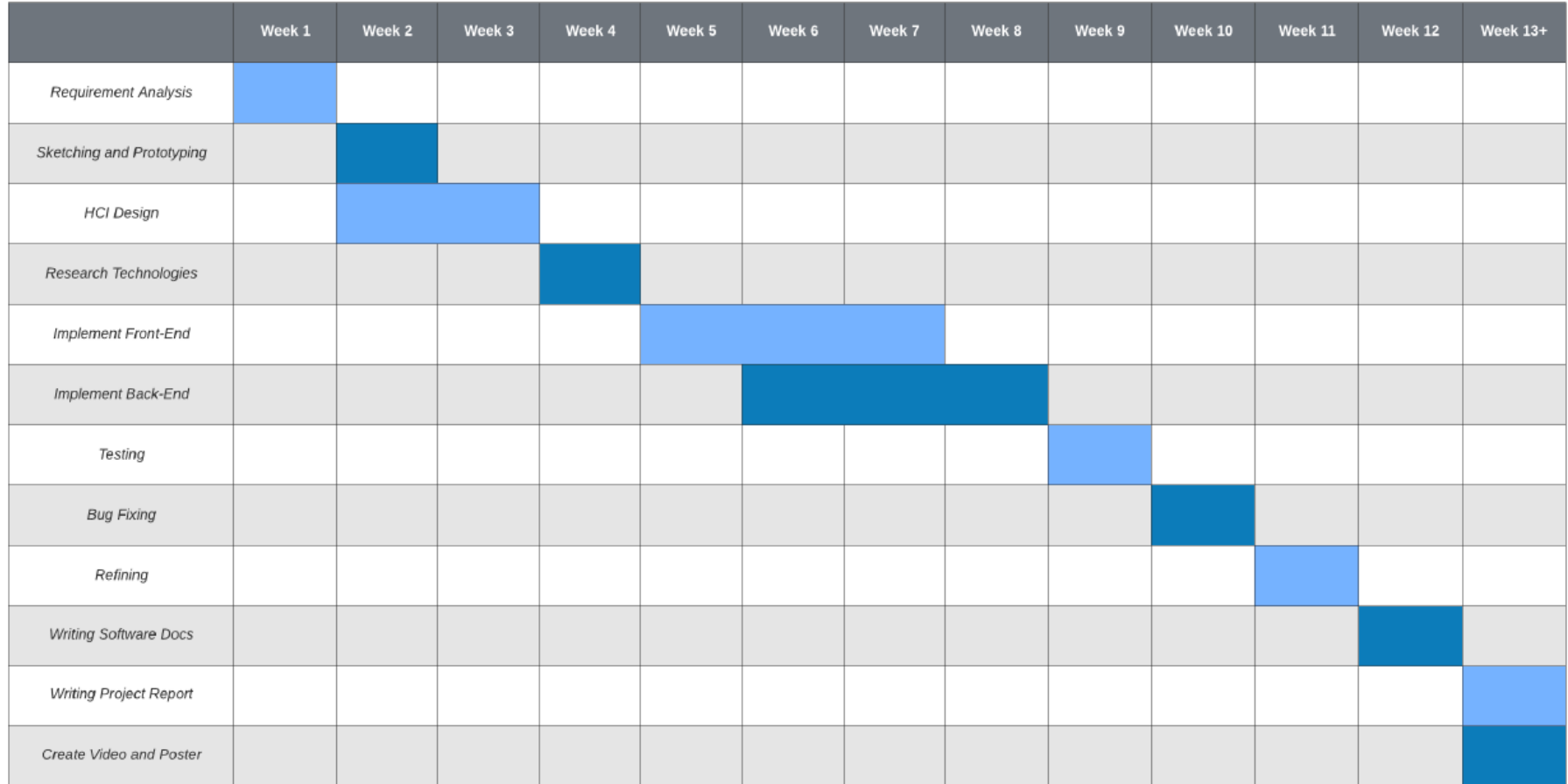
- The website folder should include all the HTML, CSS, and JavaScript files.
- You can use **any tools or frameworks** to develop your report website but the submitted website should be a static website that only includes the HTML, CSS, JavaScript files. **The examiners should not be required to install anything and can open the index.html file to navigate all the pages.**
- **Please ensure all the links work** – especially for the index.html page **to navigate all of your pages.** We won't open the html files that are not linked.

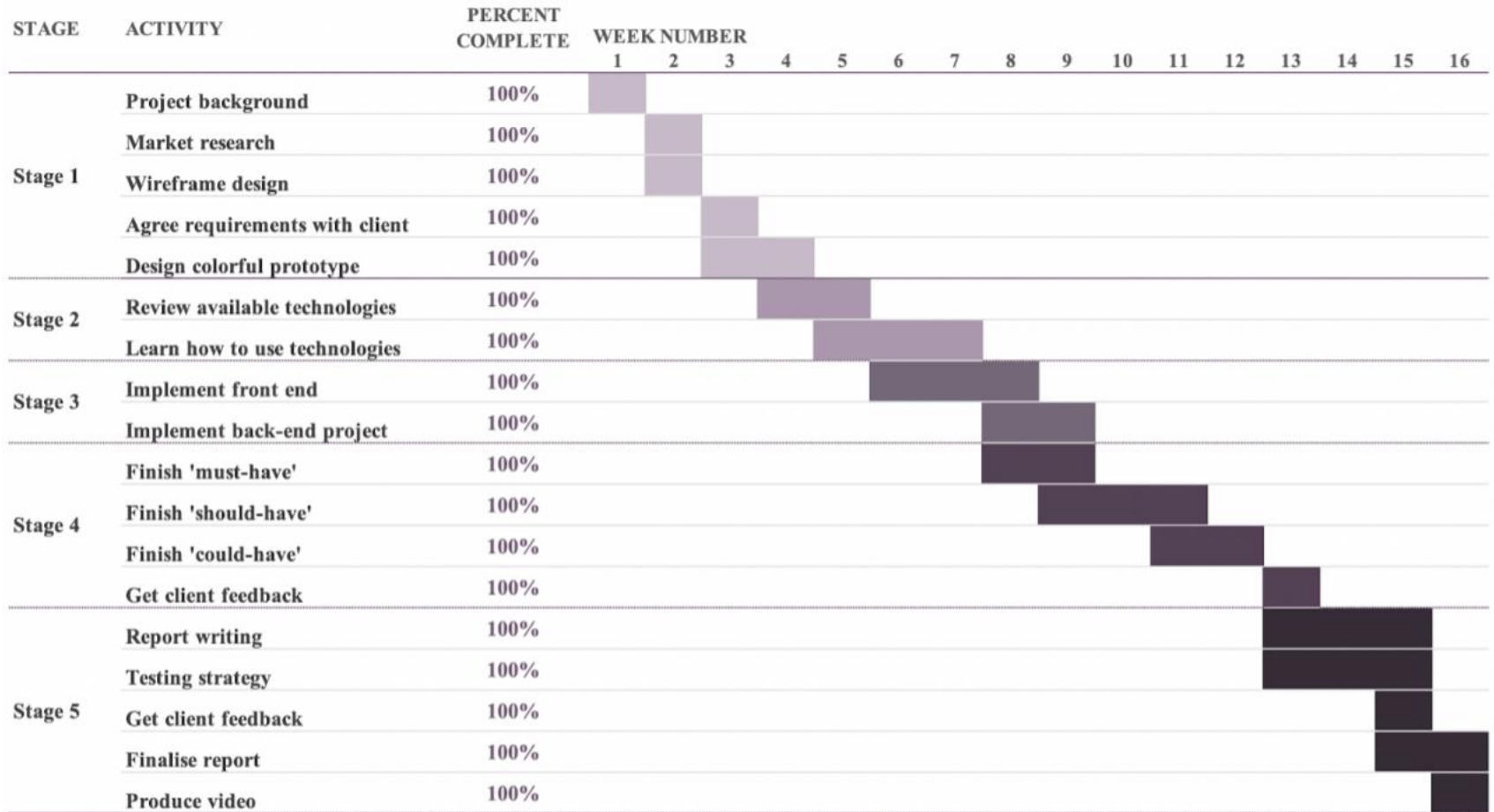
# Home

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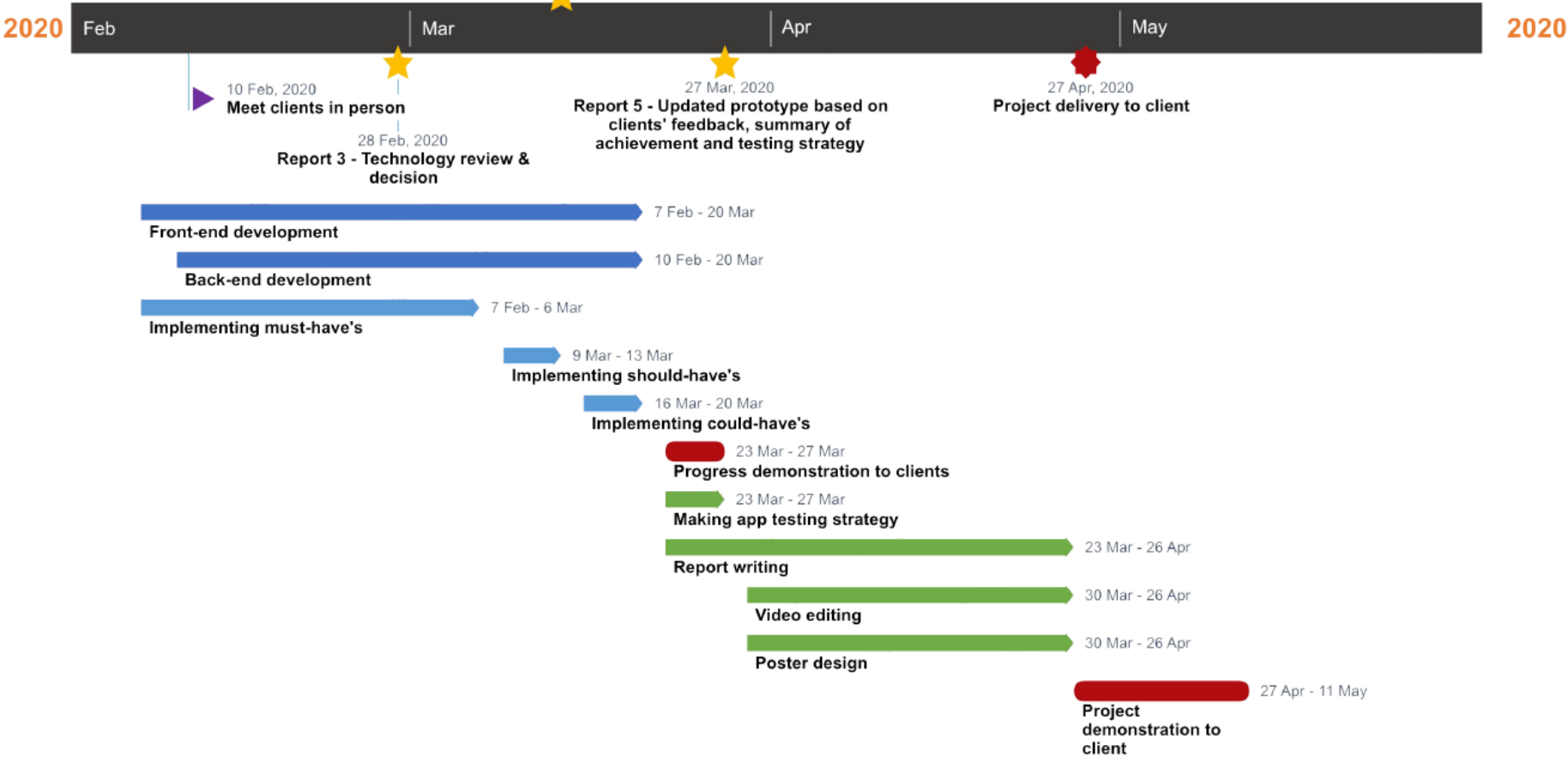
- Project title
- An abstract should include three paragraphs and the following contents
  - Problem statement
  - Your solution
  - Achievement and impact
- A 8 minutes video to introduce the project and go through the finished functionalities
- The development team
  - (including the team photos where possible) name, email, role or main contribution of each member. The roles include client liaison, UI design, researcher, programmer, report editor, tester.
  - You are welcome to include interesting background about yourself, as well as your LinkedIn profiles if you wish.
- Project management
  - Gantt chart (from October 2023 to March 2024)

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# Gantt Chart Example 3



# Requirements

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- Project background and partner introduction
- Project Goals
- Requirement gathering
  - How did you collect the requirements?
  - Did you design any survey? How did you analyse the survey data?
- Personas
  - Typical users of your project
- Use cases (if applicable)
  - Use case diagram
  - List of use cases
- MoSCoW requirement list (Functional and non-functional)
  - A table for function requirements
  - Another table for non-functional requirements: [https://en.wikipedia.org/wiki/Non-functional\\_requirement](https://en.wikipedia.org/wiki/Non-functional_requirement). For example, performance, security, usability, open source, maintainability, extensibility, etc.

# Persona Example 1

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## PERSONA 1

NAME Rachel Adam  
OCCUPATION Student  
AGE 16  
STATUS Amateur



"I would like to improve my bow arm technique so I can produce better articulated sound"

### MOTIVATION

Rachel has just finished her GCSEs and has decided to apply for music conservatoire to pursue a professional musician career.

### BACKGROUND

She is just like very other teenage that her smartphone never leave her sights. She has used mobile applications to aid her revision during GCSEs.

### GOAL

- Keep a daily diary to monitor progress
- Improve sound production through right hand bow techniques



# Persona Example 2

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Clinician



**Name:** James McMillan

**Age:** 32

**Occupation:** Clinician

**Bio:** James is a clinician at NHS. He works with patients directly and has experience working with common medical software.

Researcher



**Name:** Claire Jones

**Age:** 38

**Occupation:** Researcher at UCL Institute of Child Health

**Bio:** Claire works with various data gathered during the project. She is mostly interested in common trends and NOT in particular patients

Parent



**Name:** Anthony Paradzinski

**Age:** 42

**Occupation:** Works as a professor and is also a Mike's father.

**Bio:** Anthony wants to know how his son Mike, who has CF is feeling. Anthony needs to be able to ensure Mike does all the prescribed amount of daily exercises

Patient



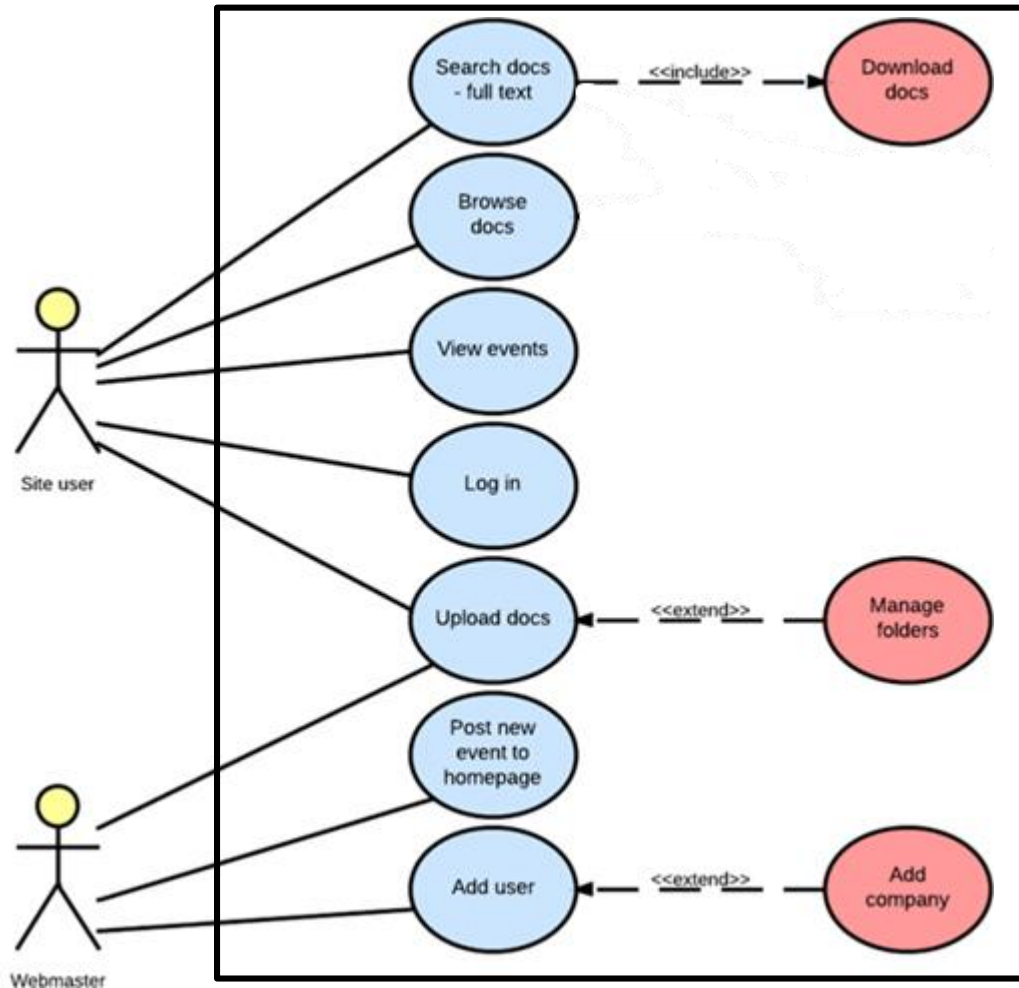
**Name:** Mike Brown

**Age:** 10

**Occupation:** Student

**Bio:** Mike is a patient at UCLH and needs to do daily breathing exercises. With Fizzyo, he wants to see how he is performing against the prescription and also see what game achievements he unlocked.

# Use Case Diagram Example



# Use Case List

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## A list of use cases

ID	Use Case For User
UCU1	Viewing the News section
UCU2	Viewing the Events section
<b>UCU3</b>	<b>Searching for Mobile applications</b>
<b>UCU4</b>	<b>Contacting Mr Yun Fu</b>
UCU5	Finding the Location of UCL
UCU6	Finding the phone number of IXN
UCU7	Searching for Web applications
ID	Use Case for Administrator
UCA1	Posting an Event
<b>UCA2</b>	<b>Posting a Project</b>
UCA3	Updating the News section

## Use case description

Use Case	
ID	UCA2
Actor	Administrator
Description	Posting a Project
Main Flow	<ol style="list-style-type: none"><li>1. System displays an administrator login view.</li><li>2. Administrator logs in.</li><li>3. System offers list of sections</li><li>4. Administrator selects WP selection.</li><li>5. System prompts for Title and Description of new project, video upload, poster photo and site image.</li><li>6. Administrator enters information and submits.</li><li>7. System displays a confirmation response.</li></ol>
Result	New Project Posted

# MoSCoW requirement list

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- **Functional** requirements

ID	Requirements	Priority
1		Must have
2		Should have
3		Could have

- **Non-functional** requirements

ID	Requirements	Priority
1		Must have
2		Should have
3		Could have

# Research

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- Related Projects Review
  - Review at least 1 existing similar project if applicable.
  - For each of the similar projects, please list the project name, main features, and what you can learn from this existing application.
- Technology Review
  - Please compare the possible solutions, describe what you choose, and explain why.
  - Please compare the possible devices (if applicable), describe what you choose, and explain why.
  - Please compare the possible algorithms (if applicable), describe what you choose, and explain why.
  - Please compare the possible programming languages, frameworks, libraries, and APIs, describe what you choose, and explain why.
- A summary of your technical decisions
- References
  - IEEE style: reference definition needs the number

"Several recent studies [1, 4, 15, 22] have suggested that. . ."

[1] L. Bass, P. Clements, and R. Kazman, *Software Architecture in Practice*, 2<sup>nd</sup> ed. Reading, MA: Addison Wesley, 2003. [E-book] Available: Safari e-book.
  - IEEE citation reference definition
    - <https://iee-dataport.org/sites/default/files/analysis/27/IEEE%20Citation%20Guidelines.pdf>

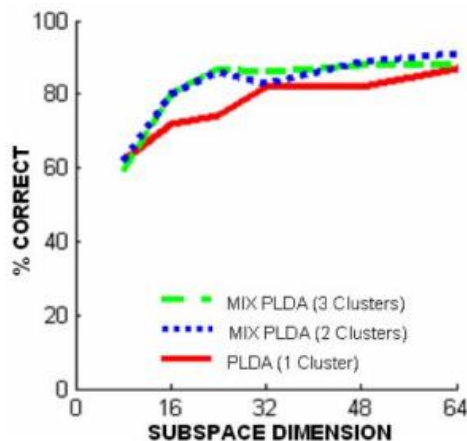
# Algorithms (if applicable)

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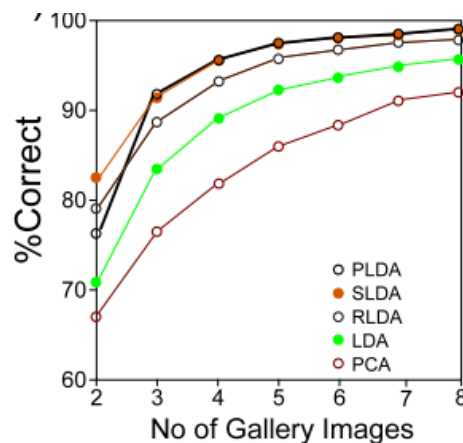
- Models
  - Describe the key idea of your chosen algorithms.
- Data
  - Dataset
  - Data Preprocess (if applicable)
  - Training and testing sets
- Experiments
  - Experiment design
  - Performance evaluation method (e.g. % accuracy)
  - Experiment results that should be presented by quantified values
  - Investigation of the Hyperparameters (if applicable)
  - Use plots or tables to show the performance comparison results
- Discussions
  - Why the algorithm fails for some test examples?
  - Suggestions to improve the performance.
- Conclusion
- References

# Plot and Table Example

Investigation of the optional  
Hyperparameters Plot Example 1



Investigation of the optional  
Hyperparameters Plot Example 2



ROC Curve Example

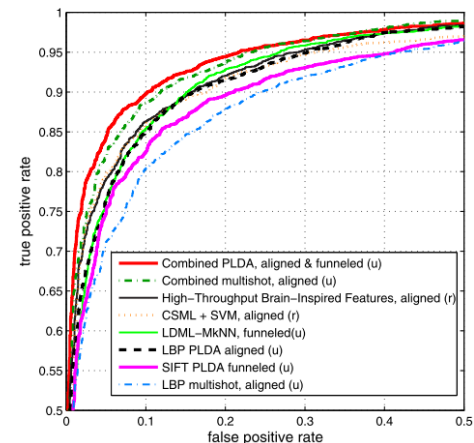


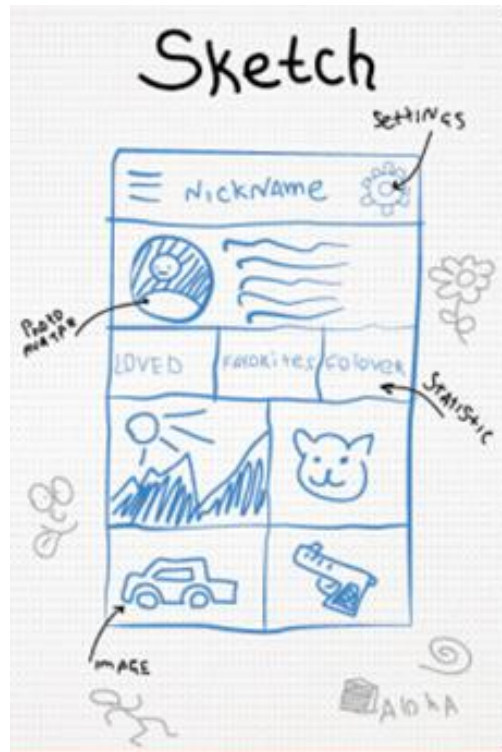
Table Example

Method	Accuracy
Combined PLDA, aligned & funneled (u)	$0.901 \pm 0.005$
Combined multishot, aligned (u) [37]	$0.895 \pm 0.005$
Combined LDML-MkNN, funneled (u) [13]	$0.875 \pm 0.004$
HTBI Features, aligned (r) [33]	$0.881 \pm 0.006$
CSML + SVM, aligned (r) [29]	$0.880 \pm 0.004$
TPLBP PLDA, aligned (u)	$0.837 \pm 0.007$
LBP PLDA, aligned (u)	$0.873 \pm 0.006$
LBP multishot, aligned (u) [37]	$0.851 \pm 0.006$
SIFT PLDA, funneled (u)	$0.862 \pm 0.012$
SIFT LDML, funneled (u) [13]	$0.832 \pm 0.004$

# User Interface Design (if applicable)

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- Design Principles (e.g. simplicity, consistency, visibility, feedback, tolerance, etc.)
- Hand-drawn sketches
- Online interactive wireframe URL (High Fidelity wireframe e.g. with Figma)



Wireframe





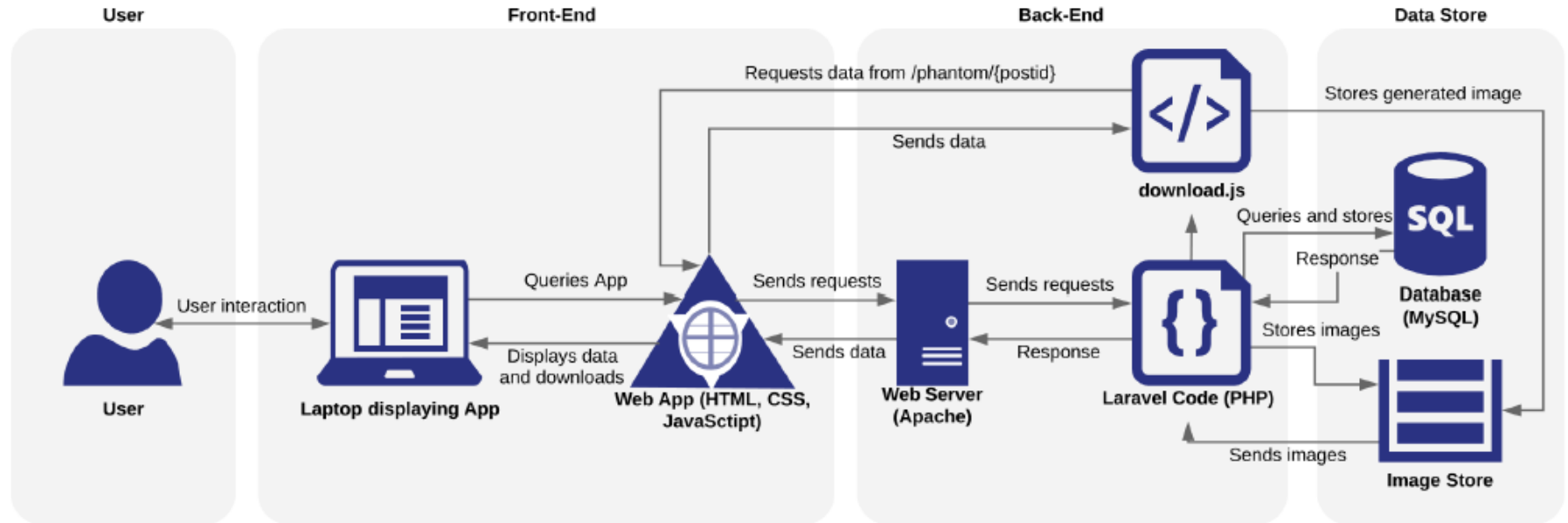
# System Design

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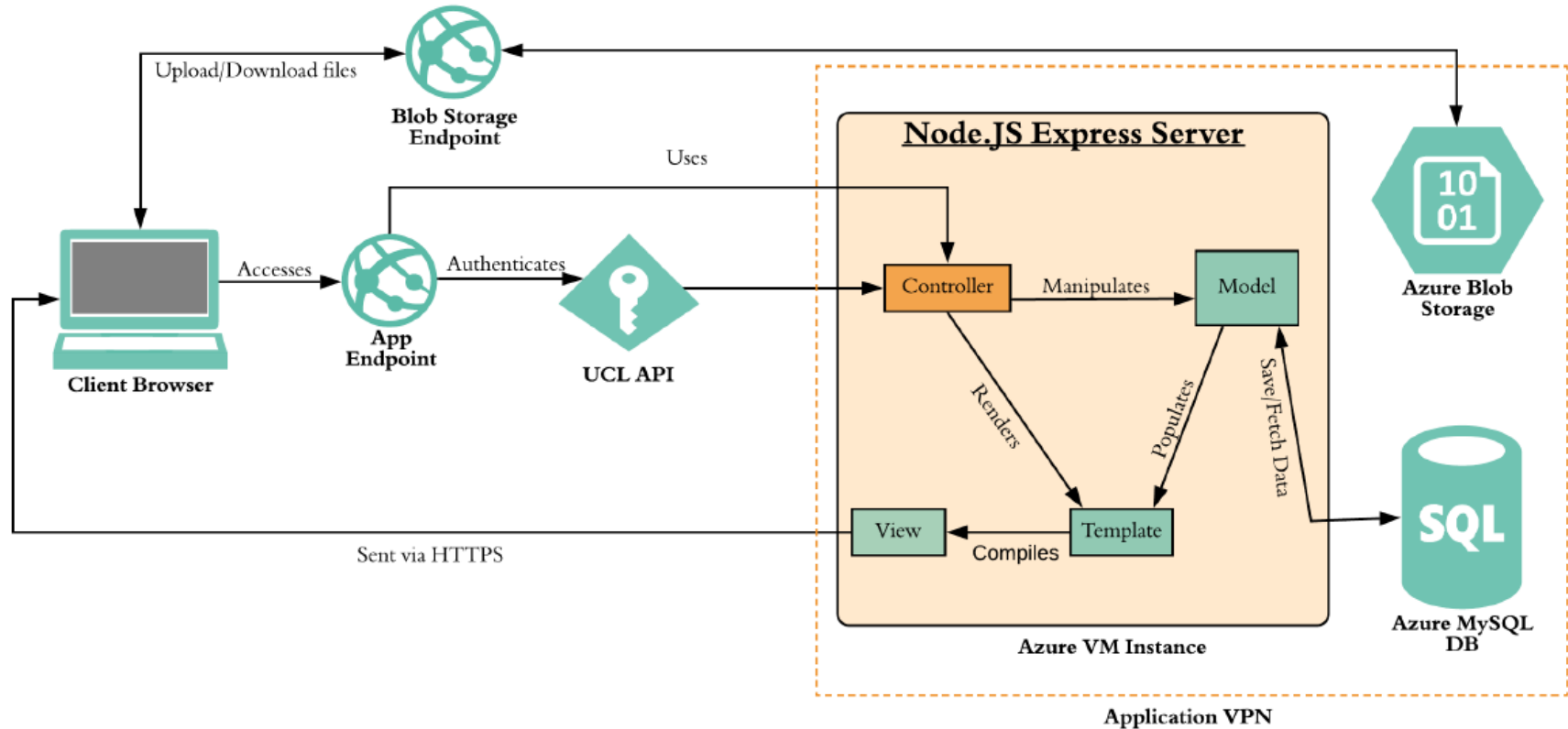
- System architecture diagram and a brief description of each component.
- Site Map (if applicable)
- Sequence Diagrams (if applicable)
- Design Patterns (if applicable)
- Class Diagrams (if applicable)
- Data storage (if applicable)
  - Please provide the data schema (e.g. ER diagram) if you have a database
- Packages and APIs defined (if applicable)

# System Architecture Example 1

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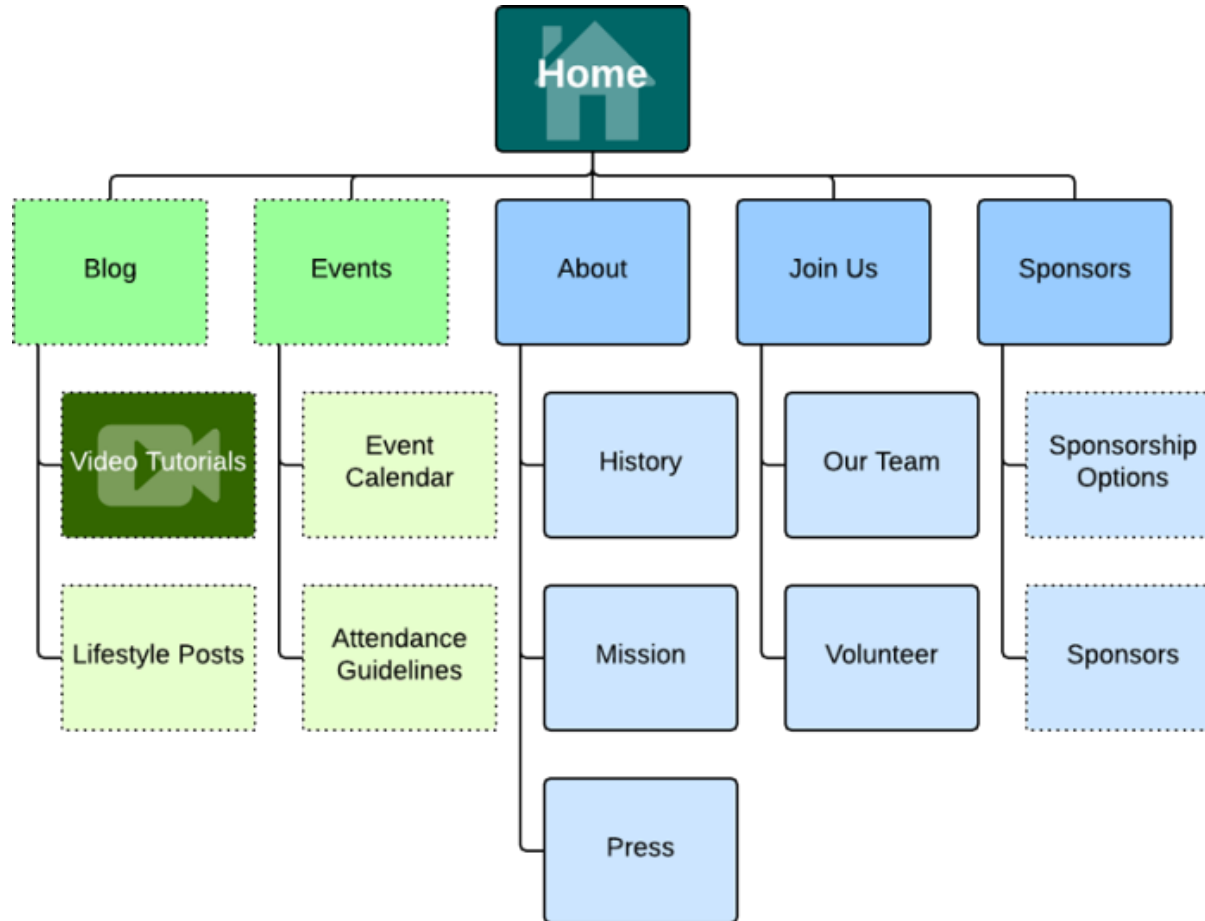


# System Architecture Example 2

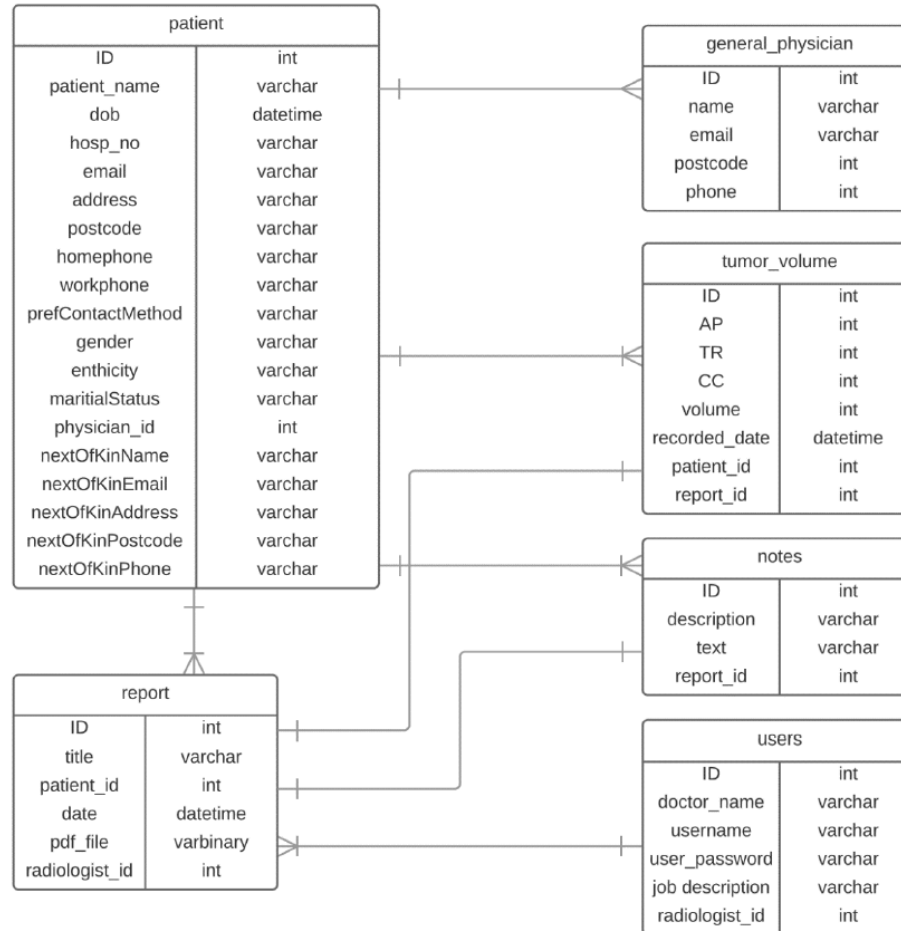


# Site Map Example

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# ER Diagram



# Implementation (Very Important)

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- Please describe how you implement the key features
  - It is very hard for other people to understand your source code by only reading your code. You need to provide the necessary explanation documentation to help other people understand how you implement the key features, for example, which frameworks or plugins, or libraries you used for a particular feature and how you use them.
  - Please describe one key feature in a subsection. We take a website project as an example, you can describe the implementation details of the following features: authentication, database connection, data table, trend chart, CSV data export, pdf generation, notification, etc.
  - If necessary, a sequence or other diagram and short code snippet can be used to help the explanation.

# Testing

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- Testing Strategy
- Unit and integration testing
- Compatibility testing (if applicable)
- Responsive design testing (if applicable)
- Performance/stress testing (if applicable)
- User acceptance testing
  - Simulated testers
  - Test cases
  - Feedback from testers and project partners
- For each test, you should explain why you do this test, which test tool you use, how you conduct the test, what results you get, and your analysis or conclusion to the results.

# Evaluation

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- Summary of achievements
  - An achievement table to list the MoSCoW functionalities, the completed states, and contributors
  - A list of known bugs
  - Individual contribution distribution table
- Critical evaluation of the project
  - User interface/user experience (if applicable)
  - Functionality
  - Stability
  - Efficiency
  - Compatibility
  - Maintainability
  - Project management
- Future work
  - How could the project be extended if you have more time



# Example of Achievement Table and Known Bug List

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- Achievement table

ID	Requirements	Priority	State	Contributors
1		Must	✓	All
2		Must	✓	All
3		Should	X	John
4		Could	X	Ali, Kai
Key Functionalities (must have and should have)		85% completed		
Optional Functionalities (could have)		65% completed		

- Known bug list

ID	Bug Description	Priority
1		High
2		Medium
3		Low

# Individual Contribution Distribution Table Example

Work packages	John	Ali	Kai
Project Partners liaison	33%	33%	34%
Requirement analysis	34%	33%	33%
Research and Experiments	50%	0	50%
UI Design (if applicable)	20%	10%	70%
Coding	20%	0	80%
Testing	0	0	100%
Report Website	60%	33%	33%
Video Editing	50%	0	50%
Overall contribution	30%	34%	36%
Main Roles (maximum three for each member)	Researcher, Report Editor, Front End Developer	Back End Developer, Report Editor	UI Designer, Front End Developer, Tester

# Appendices

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- User manual
  - Teach users to use your application.
  - It would be very helpful for the readers if some screenshots were provided to support your explanation.
  - If you need to deliver a website, please remember to provide the URL of the live website, the username, and the password to log in to your website if authentication is required.
  - If there is more than one type of user (e.g. admin and normal user), please provide one account for each type of user.
- Deployment manual (**very important**)
  - This should provide a step-by-step guide to show your project partner how to deploy your project after they get your source code.
  - If needed for some difficult parts, please provide some screenshots.
- Legal issues and processes
  - Notes have been uploaded already to Moodle for you to make use of in your project.
- Development Blog
- Monthly Video

# Legal Issues and Processes

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- The notes for this section will be available in the “Legal Implications - Data, IP and GDPR” section on Moodle.
- There is an extensive deck of notes for you to read through.
- Your website should include GDPR and privacy of data in your project; **please document this on your project website under Appendices.**
- Include a statement on the source code license (check with your Project Partners first) and GDPR of data governance.

# Development Blog

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- This is an open and public summary of your team's project. It should include your team website's key assets, progress, and experimental design. You can use WordPress, your own preferred blog, or any of the UCL blogging tools.
- The Project Partners have asked to keep track of your progress through the two terms. Ideas for the blog would be to include Interesting research, examples, reference materials, sketches (including from your HCI component), screenshots, algorithm code snippets especially what you have found and customised for the client's solution, and of course, your own diagrams and models should be posted here.
- Check it with your Project Partners. You can post your team's development blog on social media with their emailed permission. Each student in a team should be able to contribute to this.
- As they are a diary, you should be aiming to update these blog entries every two weeks (do not submit it all at the end!).

# Monthly Video

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- Each month you should ideally be preparing a 1-2 minute video update about interesting findings and progress made on your experiments.
- Use the PowerPoint PPTX template found in the “Project website, videos, and blog” section as the start for your video (3-5 seconds).
- Email a copy of the video in **MP4** format, to your TA, Project Partner, and tutor, via a OneDrive link. Please remember to set the OneDrive sharing setting of your video file to be ‘Anyone with the link’. If you need a date for your diaries to remember, do this by the 15<sup>th</sup> of each month.
- This can go on your project website once it has been approved, UCL will put it onto their YouTube channels which you can then use the link to on your project website.

# Report Website Marking Criteria

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- **Home:** Is the abstract explained well? How is the Gantt chart?
- **Requirements:** Are the project background and goals explained well? How well the project requirements are captured and described? Are personals and use cases described well? Are the MoSCoW requirements clear and specific?
- **Research:** How well was the related project reviewed? How well did you compare devices, tools, software, API, libraries, and algorithms? Are references in place?
- **UI Design** (if applicable): Are the UI design principles, sketches, and prototypes documented well?
- **Algorithms** (if applicable): Is the model, experiments, results, and discussion described well? Did you build up a quantified scheme to evaluate the performance?
- **System Design:** Has the system architecture design been explained well? Quality of the ER diagram and suitable diagrams.
- **Implementation:** How well is the implementation of key features described?
- **Testing:** Is there a good testing strategy and thorough testing?
- **Evaluation:** Is there a good evaluation of the end results of the work? Are the criteria relevant, and are the conclusions justified? Is the future plan well documented? Is the plan concrete?
- **Appendix:** Are the user and deployment manuals clear?
- **Format:** Does the website have a good format?
- **Clarity:** Is the content well-written and readable? How are the spelling and grammar of the report? Does it communicate effectively?

# Mark Range for Report Website

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Mark Range	Description	Criteria
90 - 100	Exceptional	Publishable quality. Close to faultless in documentation.
80 - 89	Outstanding	Could lead on to publishable work
70 - 79	Distinction	Very well written with a clear logical structure
60 - 69	Good (merit)	Clear project write-up with logical structure
50 - 59	Satisfactory (pass)	Adequate project write-up, lacking clarity or detail in places, or containing irrelevant material
40 - 49	Weak (BSc and MEng Pass)	Write-up is somewhat incoherent, rushed, contains important omissions, or irrelevant material
30-39	Inadequate(Fail)	Documentation is poor, unstructured, some parts missing.
0 - 29	Unacceptable fail	Documentation is substantially absent, badly written, incomprehensible or wrong.



# 4. Video



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# Portfolio Video Submission

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- 8 minutes
- **mp4 is as the only valid format, 4K or 1080p is preferred where possible.**
- If you or your industry partner want to publish your videos on YouTube or other platforms for future reference and the publicity of your project, you must get an email (written clearance) from your Project Partners for permission. If the partner refuse to agree to publish your video, please accept this as their wish for their own reasons.
- Note this is the video included with the Portfolio and is intended to be a technical description of the project used for assessing the project results. The Presentation 2 video is separate and aimed at giving a general view of the project results to a wide range of viewers, not just technical people. See the guidelines in the “Presentation 2” section on Moodle about the presentation 2 video.

# Video Content

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- The 8 minutes video should include
  - Start with an introduction slide of your project title, team number, team members, and Project Partners.
  - Introduce the background, problem, and goals of your project.
  - List the **key** requirements, please do not list all the requirements.
  - Use a system architecture diagram to introduce your solution.
  - Describe the main technologies that you use to implement the project.
  - Go through the finished functionalities.
  - Summarise the achievements.

# Notes For Videos

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- Please do not submit a silent video. Please have a team member explain things.
- Please make sure the voice of the narrator is clear and does not contain any microphone or background noise.
- Please do not include any background music.
- Please make sure the resolution of the video is high enough to read the text on your slides.

# Video Editing

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- Links to editing tools here: <https://wiki.ucl.ac.uk/display/UCLELearning/Video+editing+tools>
- Apple users - Apple users can make use of iMovie.
- Video Editors for PC
  - Windows 10 and Windows 11 users (with latest updates) can make use of Microsoft Video Editor
  - Free VideoDub: <http://www.dvddvideosoft.com/products/dvd/Free-Video-Dub.htm#.VY1Nv2DtlmR> - WATCH FOR ADDITIONAL SOFTWARE INSTALLATION
  - MPEGStreamclip: <http://www.squared5.com/svideo/mpeg-streamclip-win.html>
  - Lightworks – free: <http://www.lwks.com>
  - Avidmux: <http://fixounet.free.fr/avidemux/index.html> - converts video
  - VideoPad Masters: [http://download.cnet.com/VideoPad-Masters-Edition/3000-13631\\_4-10906278.html](http://download.cnet.com/VideoPad-Masters-Edition/3000-13631_4-10906278.html)
  - WeVideo: <https://www.wevideo.com>

# 5. Individual Report and Contribution



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# Individual Report

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- An individual report should be uploaded to Moodle before 16:00 Wednesday 25 March 2024.
- **3-5 pages**
- **PDF is the only valid format**
- The individual report should cover the whole development (last five weeks of term 1, the Christmas holiday, and term 2).
- Please use section numbers such as 1 and 1.1 to organise your report.

# Content of Individual Report

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- The project title, team number, your name, and your student ID
- List your main personal contributions to the project (e.g. Project Partner liaison, research, UI design, coding, testing, website, and video editing)
- The main difficulties you faced and how you overcame them
- Assessment of each team member (including yourself)
  - List the strengths and weaknesses (e.g. reliability, technical skills, communication skills, document writing etc.) of each member (**including yourself**) and the role that each member is best suited to (Project Partner liaison, UI designer, researcher, programmer, report editor, tester).
  - Please evaluate the performance of your team members and yourself via a number between 1 (poor) and 10 (excellent). Please give some evidence to explain why you gave the number.
  - (**optional**) If you have a different opinion about the individual contribution table on the report website, please indicate which part you do not agree with and explain why.



# Individual Assessment

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- **Your individual performance will be reviewed on**
  - The individual contribution distribution table on your report website
  - Your individual report
  - Assessment of you in your team members' individual reports (We use this information as marking reference but not peer assessment)
  - TA's feedback
- **Note:** The consistency of your report and contribution is compared with the assessment made by other team members. The individual assessment is mainly based on your contribution to the project, not just the individual report.

# Variations in Marks for Group Components

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- By default, all team members have the same team marks for the team work (code, website, video).
- **However, this is not fixed and marks can be reduced for individuals.**
  - This occurs if a team member does not participate, or fails to properly contribute such as by leaving tasks undone. This leads to reduced team marks, **potentially down to zero if no contribution is made.**
- In practice, we have found that in the large majority of teams, all individuals contribute relatively evenly, so not many variations are needed.

# Variations in Final Marks for Team Members

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- Members of the same team might not get the same mark due to the 30% individual portfolio mark.
- The individual mark is based on the individual report and contribution to the project.