**A Descriptive Template for Writing Project Documentation**

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Under the supervision of Tianshu Xu

**Disclaimer**

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the Degree of Bachelor of Science in Computing at Griffith College Cork, is entirely my own work and has not been submitted for assessment for an academic purpose at this or any other academic institution other than in partial fulfilment of the requirements of that stated above.

**Signed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Acknowledgements

Here you can thank your family, colleagues, etc.

I would like to express my deepest appreciation to my lecturer Tianshu Xu for helping me with the supervision of this project. His invaluable insights and expertise have been instrumental in shaping the direction and outcome of this project. I would also like to extend my appreciation to my friends wholeheartedly. Finally, I am deeply grateful to my family for their unwavering support and encouragement throughout the course of this project.

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# Abstract

Junyers is a mobile application that aims to assist parents in tracking and monitoring their baby's health, development, and routine. The motivation behind this project is to provide parents with a convenient tool that can help them manage the daily tasks of taking care of a baby. The goal of the project is to create an easy-to-use, reliable, and comprehensive baby app that can help parents keep track of all the essential aspects of their baby's growth and development.

The app includes features such as a feeding tracker, diaper tracker, sleep tracker, growth tracker, GPS tracker and Augmented reality. These features allow parents to keep track of their baby's feeding patterns, diaper changes, sleeping habits, growth progress, baby’s whereabouts and how to handle a baby. The project was developed using Android Studio (Java, XML) for the frontend and SQLite for the backend.

The project's objective of developing a dependable and thorough baby app that can assist parents in managing the day-to-day responsibilities of taking care of a baby is achieved. The software gives parents a practical tool for monitoring their child's health and growth, which can ease their concerns and lower their stress levels. The software also enables parents to communicate with caretakers or medical experts to share information, fostering teamwork and communication. Overall, the project offers parents a useful tool that will help them better handle the difficulties they face on a daily basis while raising a child.

# Chapter 1. Introduction

**General Material:**

First and foremost, you must understand what your project is. **It is a major contribution to your degree.** Your project must address several important points, including your ability to:

* Understand the state-of-the-art of a specific area
  + You will need to learn, know and adapt to the most current technologies in your area
* Learn and apply new technologies on your own
  + The ability to work under your own inertia on new/changing technologies is important
* Develop and demonstrate a productive relationship with your supervisor
  + Collaboration and working productively with others is a very important aspect of your abilities. Co-workers, colleagues and bosses will always be there
* Demonstrate a comprehensive understanding of development lifecycle
  + You need to know what a project entails, top to bottom, start to finish

Your work should reflect on your ability to:

* + Take an idea, do background research, understand it thoroughly, and develop and demonstrate an application based on that idea
  + Describe your project in well structured and formatted documentation so that others can understand what you achieved
  + Demonstrate a working application, simulation results, etc.
  + Discuss your project with faculty examiners, answering any questions put to you regarding your project
  + Take something you have learned and push it further – to take it beyond the classroom

Your project should be critical and analytical. Your project and especially your documentation should be focused on not just “doing”, but explaining. Why are you doing this? What does it do? Why are you doing it this way? Why is it different? Why is it better? Why is it worse? Where are its strengths? Where are its weaknesses? Where is it going? Where is it not going? Notice that the word “how” has not yet been mentioned. How you complete your project is only one part of the whole. Equally important to the “hows” are these “whys” – the decisions you made along the way and the results and impacts of those decisions.

The title page, as in this template, is centered and not numbered. All other front matter (Disclaimer, Table of Contents, Acknowledgements, Abstract, etc.) each start on their own page (except for lists of equations/figures/tables if they are short) and are numbered in lower case Roman numerals (i, ii, iii, iv, v, vi, …). The Table of Contents should be automatically generated by MS Word or the word processing package you are using. The same goes for lists of equations/figures/tables. Do not forget to sign and date the Disclaimer of your final bound copy which you will turn in to the faculty.

Starting on the first page of Chapter 1, page numbering should start over (from 1) and count normally (1, 2, 3, etc.). Font should be 12 pt., fully justified, with 1.5 line spacing. Standard MS Word margins are used (as they are in this document). Consistency is the key to your documentation. All headings should have the same style, all margins should be the same, etc.

The exact chapter layout of your documentation should be discussed with your supervisor and made to fit your project. A traditional layout would be the following:

1. Introduction (*Page No 1 Starts here)*
2. Background
   1. Literature Review
   2. Similar work
3. Methodology
4. System Design and Specifications
5. Implementation
6. Testing and Evaluation
7. Conclusions and Future Work

(Un-numbered) Bibliography

(Un-numbered) Appendices

From *Introduction through Conclusion and Future Work* should be between 40 and 50 pages. Lengths outside these limits need to be approved by your supervisor. The subsections of Chapters 3-6 will be specific to your project, and additional chapters may be necessary. You should discuss this further with your supervisor. Remember that the 40-50 page guideline does not include front matter, references, or appendices. Chapters should always start on their own fresh page, never on a page where another chapter ends.

**Chapter Specific Material:**

This chapter is all about your project as a whole, not specifics. It is intended to give the reader a brief summary of the “what”, and the “why”, with a very high-level “how”. Technical details and procedures will be discussed in later chapters.

## 1.1 “Your area”, (or specific field of expertise, problem name, etc.)

**In this subsection you briefly state what your project is. A good rule of thumb is to use about 3-4 paragraphs, expanding on what the “what” part of your abstract.**

## A mobile application called Junyers has been created especially for parents who want a simple and all-inclusive way to manage and keep tabs on their child's routine, routine development, and health. A variety of tools in the app can assist parents in monitoring all the critical facets of their child's growth and development.

## One of the primary features of Junyers is the feeding tracker, which allows parents to keep track of their baby's feeding patterns. This feature is especially useful for breastfeeding mothers who may need to monitor their baby's feeding frequency and duration. The diaper tracker is another helpful feature that can help parents keep track of their baby's diaper changes, making it easier for them to identify any potential issues or irregularities.

## The sleep tracker is another key feature of Junyers, which can help parents keep track of their baby's sleeping habits. This feature can be particularly useful for parents who are trying to establish a sleep routine for their baby. The growth tracker is also an essential feature that allows parents to monitor their baby's growth progress and compare it against standard growth charts.

## In addition to these features, Junyers also includes a GPS tracker, which can help parents keep track of their baby's whereabouts, especially when they are not with them. This feature can give parents peace of mind, knowing that they can always locate their baby. The Augmented Reality feature is also a unique addition to the app, which can help parents learn about how to handle a baby in a safe and effective way.

## Overall, Junyers is a thorough and trustworthy baby software that can help parents organize the everyday tasks involved in caring for their child. The software can help parents feel at ease and relieve stress by giving them a simple tool to monitor their child's development and health.

## 1.2 “Goals” (or something similar)

**In this subsection you expand again on your abstract but explaining in more detail why you did this project, what you want to achieve, what your goals are, who will benefit from your work and why.**

The decision to create Junyers was motivated by the common challenges that new parents face in taking care of their babies. Parenting is an incredibly rewarding experience, but it can also be stressful and overwhelming, especially for new parents who are adjusting to the demands of caring for a new human being. Parents often struggle to keep track of their baby's health, growth, and routine, leading to feelings of anxiety and uncertainty.

My goal with Junyers is to provide parents with an easy-to-use and reliable tool that can help them manage the daily tasks of taking care of a baby. By providing features such as feeding, diaper, sleep, and growth trackers, as well as GPS tracking, Junyers can assist parents in tracking their baby's health, development, and routine in one convenient location. With Junyers, parents can quickly access critical information about their baby's habits and needs, making it easier for them to make informed decisions about their baby's care.

I also wanted to create a tool that could facilitate communication and collaboration between parents and caregivers, as well as medical professionals. By providing a platform for sharing information, Junyers can help ensure that everyone involved in a baby's care has access to up-to-date and accurate information. This can improve the quality of care a baby receives and help reduce the stress and anxiety that parents often experience when managing the care of their child.

Ultimately, my goal with Junyers is to benefit parents and their babies by providing a useful and honest tool that can help them navigate the challenges of raising a child. I hope that Junyers can help parents feel more confident and supported in their parenting journey, leading to better outcomes for both parents and babies.

## “Overview of Approach” (or something similar)

**In this subsection you briefly describe how you achieved your goals and accomplished your work. This should be done at an abstract level at this point. You can name the technologies involved and why you chose them, etc., but the details are for later.**

To achieve the goal of creating a practical baby app, I utilized a variety of technologies and programming languages. I chose Android Studio, as it is the official Integrated Development Environment (IDE) for Android app development and has a large community of developers, making it easy to find support and resources. I used Java and XML for the frontend development, which allowed me to create a visually appealing and intuitive user interface.

For the backend, I utilized SQLite, a lightweight relational database management system that is well-suited for mobile apps. The data is stored in a local database but the final goal would for it to be synchronized across all devices in real-time using SQL, allowing parents to access and update their baby's information from anywhere.

Throughout the development process, I also implemented various testing and debugging techniques to ensure the app's reliability and functionality. I utilised unit testing to test individual components of the app and integration testing to test how the different components interact with each other. We also used user acceptance testing to gather feedback from parents and ensure the app met their needs and expectations.

By utilising these technologies and development techniques, I was able to accomplish my goals of creating an easy-to-use, reliable, and comprehensive baby app. Overall, the project provides a valuable tool for parents, making it easier for them to manage the daily challenges of raising a baby.

## “Document Structure”, “Document Layout” (or something similar)

**In this subsection (the last of Chapter 1) you describe your document layout. It should read similar to the following:**

**“The rest of this document is as follows. Chapter Two provides a literature review of the area of <your topic area> and the sources consulted in accomplishing my project, in addition to related work. Chapter Three describes the methodology and high–level design of my project structure. In Chapter Four, I discuss the system design, and requirements/specifications including any hardware and software used. Chapter Five provides the implementation details of my project/system/etc. In Chapter Six, details of the working prototype of my project/system/etc are provided, including my testing and evaluation technique. I also discuss results including any revisions to the overall design and implementation that were deemed necessary. Finally, Chapter Seven presents conclusions and future work.”**

The rest of this document is as follows. Chapter Two provides an overview of related work and existing baby apps on the market, as well as a literature review of the area of baby tracking and monitoring. Chapter Three describes the methodology and high-level design of the Junyers baby app, including the software development life cycle (SDLC) followed, and the tools and technologies used.

In Chapter Four, I discuss the system design and requirements/specifications, including the architecture of the app, the database schema, and the user interface design. I also provide an overview of the features implemented in the app. Chapter Five provides the implementation details of the Junyres baby app, including the frontend and backend development and the APIs used.

In Chapter Six, I discuss the testing and evaluation of the Junyers baby app, including the different testing methods used, such as unit testing, integration testing, and user acceptance testing. I also present the results of the testing and evaluation, including any revisions made to the design and implementation based on feedback from testing.

Finally, Chapter Seven presents the conclusions and future work, including a summary of the achievements of the Junyers baby app, the limitations and challenges faced during the development process, and future enhancements and improvements that can be made to the app.

# 

# Chapter 2. Background

## 2.1 Literature Review

For myself to get guidance on why I chose an app for parenting, I had to get an understanding of where do parents lie on using mobile apps to help them in their journey of caring for their child. These are a couple of articles along with health professional opinions and media publications to support that.

* In recent years, there has been a significant increase in the development of mobile applications. According to a report by App Annie, a mobile app analytics company, global app usage increased by 40% in 2020, with consumers spending over 200 billion hours in mobile apps. The report cites several reasons for the increase, including the COVID-19 pandemic, which forced people to spend more time at home and rely on mobile devices for work, entertainment, and social connections. Other factors include the growing availability of affordable smartphones, faster mobile networks, and the increasing functionality and usability of mobile apps *(Sydow, 2021).*
* To make it convenient, as mobile technology has grown, parents are increasingly using apps to complete parenting-related duties. According to a Pew Research Centre research, 81% of parents in the US use their smartphone for online duties pertaining to their child's education, health, or social activities. 96% of parents in the US use a smartphone. *(Auxier et al., 2020)*
* There is also an increase in percentage of breastfeeding women who have access to an infant feeding tracker to assist them on their journey towards caring for a new born as it will give them, according to *(Dienelt et al., 2019),* “*greater control, confidence and efficacy at a time of transition and stress in the early stages of parenting an infant”*.
* The media also have their own opinion concerning the advantages and disadvantages of using baby apps to care for children. According to Dr Jacqueline Miller in a media article *(www.firstfiveyears.org.au, 2020 -🡪 footnote)*, mothers had pros and cons for using various baby apps, “*For some mothers, it gave them reassurance that things were going normally, particularly in the early days of feeding when things were still establishing. For others, the data produced by the app was a bit overwhelming, however, instead of relying on memory it provided a record of things that could then be discussed with a health professional”.*
* There has reports in multiple media articles on the impact of the quality of sleep on children’s mental health. As mentioned in an important medical article issued by the National Institutes of Health in USA, “The researchers found that children in the insufficient sleep group at the start of the study had more mental health and behavioural challenges than those who got sufficient sleep. These included impulsivity, stress, depression, anxiety, aggressive behaviour, and thinking problems. The children with insufficient sleep also had impaired cognitive functions such as decision making, conflict solving, working memory, and learning. Differences between the groups persisted at the two-year follow-up” (Contie, 2022).
* Since we now know that there are consequences of being sleep deprived on kids, it is primordial to develop apps to monitor infants sleep according to *(Ball and Keegan, 2022)* “We encourage parents to use their phones, tablets and other digital devices as information sources to learn about their babies’ sleep needs and their sleep development, and to connect with other parents to exchange knowledge and experiences, rather than as tools to pacify their baby remotely, and substitute for parental presence”.

To move to the practical side of how to create an android app, I had to resort to books and online material such as (Burton, 2015), (Joseph Seymour, 2014), (DiMarzio, 2016) and (Iversen and Eierman, 2014). I also resorted to using the (Android Developers, 2018) as it provides you mostly the syntax of making an app in android studio.

* These book/online materials mentioned above guide users through the process of setting up their development environment, including the installation of the necessary software tools like the Java Development Kit (JDK) and Android Studio.
* The core ideas and elements of Android apps, such as activities, intents, layouts, and user interfaces, are covered in this section on understanding the basics of Android app development.
* Building user interfaces: The book shows how to manage user input through buttons, text fields, and other UI elements and how to build aesthetically pleasing user interfaces using XML layout files.
* Data handling: This section discusses methods for storing and retrieving data in Android apps, including using SQLite databases, file storage, and content providers.
* Multimedia integration: The book presents methods for integrating visual, aural, and visual multimedia components into Android apps.
* App distribution and publication: It offers instructions on how to get an app ready for release, including creating a signed APK file and uploading the software to the Google Play Store.

In summary, the literature suggests that mobile applications have the potential to support parents and promote early childhood learning and development. However, effective app design and usability are crucial to their success. This dissertation will contribute to the field by developing and evaluating a baby Android app that supports infant learning and development and facilitates parent-child interaction.

Studies have shown that mobile applications can provide valuable support for parents during their child's early development. According to a study by Falck-Ytter and Gredebäck (2018), mobile apps can help parents monitor their child's development, track their developmental milestones, and identify potential developmental delays. The authors suggest that apps that provide feedback and guidance for parents may be particularly beneficial.

Mobile applications can also play a significant role in promoting early childhood learning and development. A study by Hwang et al. (2019) found that mobile apps can improve cognitive and language skills in infants and young children. The authors noted that apps that incorporate interactive features, such as games and videos, are more effective in promoting learning.

Another area of research has focused on the design and usability of mobile applications for babies and young children. According to a study by Wilks and Jones (2020), the design of baby apps is crucial to their effectiveness. The authors suggest that apps should be designed to be simple and easy to use, with clear instructions and minimal distractions.

Furthermore, mobile applications can also be used to promote parent-child interaction and bonding. According to a study by Lauricella et al. (2016), mobile apps can facilitate shared activities between parents and children, such as story reading and singing. The authors found that such activities can help promote parent-child interaction and bonding, which can have a positive impact on child development.

## 2.2 Related Work

**In this section you present the findings of a review of *specific works closely related to your project.* You should discuss the similarities and differences between your project and others like it that have been done before. A pointed and convincing argument should be presented as to *why* your approach/technique/etc. is an improvement/extension/etc upon previous work. You do not need to go into the specific details on *how* this is achieved here. This will be explained throughout the coming chapters. For now your job is to bring your reader up-to-speed with the current state-of-the-art, how your project fits into that, and why yours is better!**

In this chapter, I will present the findings of a review of specific works closely related to my baby android app project. I will discuss the similarities and differences between my project and others like it that have been done before. I will also present a convincing argument as to why my approach is an improvement upon previous work.

Previous Work:

There are many baby tracking apps available in the market that offer similar functionalities to my baby android app project. Some of the popular baby tracking apps include Baby Tracker, Feed Baby, and Baby Connect. These apps allow parents to track their baby's feeding, diaper changes, sleep patterns, and other important information.

Similarities and Differences

My baby android app project shares many similarities with the previous baby tracking apps in terms of the functionalities offered. However, my project differs in terms of the user interface design and the specific features offered. My project is designed to have a simple and intuitive user interface that is easy for new parents to navigate. Additionally, my project offers features such as reminders for feeding and diaper changes, as well as a summary view of the baby's daily activities and an AR feature to help along with handling a baby.

Improvement over Previous Work

While there are many existing baby tracking apps, my project is an improvement over previous work for several reasons. Firstly, the simple and intuitive user interface design makes it easier for new parents to use the app. Secondly, the reminders for feeding and diaper changes help parents stay organized and reduce the chances of missing important tasks. Finally, the AR feature which can help parents identify how to carry a baby.

Conclusion

In this chapter, I presented the findings of a review of specific works closely related to my baby android app project. I discussed the similarities and differences between my project and others like it that have been done before. I also presented a convincing argument as to why my approach is an improvement upon previous work. While there are many existing baby tracking apps, my project's simple and intuitive user interface, reminders for feeding and diaper changes, and summary view of the baby's daily activities make it a valuable addition to the market.

**General Material:**

References are a very important part of your work and must be done carefully and correctly. References are how readers of your work will connect and relate your work to the work of others and your topic area in general. Without proper referencing your documentation would only be a description of work, not a piece of work on its own, that is related to your field.

**Bibliography Style:**

* The Bibliography (or References) must contain a list of books, journal and conference articles and all other material cited in the main body of text (except websites).
* Entries in the bibliography must contain: author(s), title, conference/journal, publisher, date of publication and possibly other reference-specific information. Consult your supervisor.
* Each entry in the bibliography is numbered consecutively in order of appearance, such as [1], [2], etc. These citation numbers are included in the main body of text in square brackets.
* All bibliographical information is exclusively included in the list of “References” section at the end of the document, next to the respective citation number.
* Please see the following example.

**Bibliography Example:**

**Main body of text:**

“A prefix labelling technique presented in [1] seems to be appropriate for topologies similar to a Tree structure. Our research focuses on developing a prefix labelling technique of B-Tree topology [2]. Once a network is organized as a B-Tree the prefix can be calculated using a distributed process as suggested in [1]. The ultimate aim is to achieve load balancing for distributed systems [3], [4] organized as a B-Tree topology.”

**Bibliography (or References) (placed at end of documentation):**

1. C. Li and T.W. Ling. An Improved Prefix Labeling Scheme: A Binary String Approach for Dynamic Ordered XML. *10th International Conference on Database Systems for Advanced Applications, DASFAA 2005*, Beijing. Volume 3453*/*2005 , April 2005, pp.125 *−* 137.
2. D. Comer. Ubiquitous B-Tree. *ACM Computing Surveys (CSUR)*,Volume 11, Issue 2, June 1979, pp. 121*−*137.
3. Ka-Po Chow, Yu-Kwong Kwok. On Load Balancing for Distributed Multi-agent Computing. *IEEE Trans. on Parallel and Distributed Systems*, Volume 13, No 8, 2002. pp. 787 *−* 801.
4. M. H. Willebeek-LeMair, A. P. Reeves. Strategies for Load Balancing on Highly Parallel Computers. *IEEE Trans. on parallel and distributed systems,* Volume 4, No 10, Sep 1993.

**End of Example**

All referenced websites must be *terminal references*. A terminal reference is the “root” reference for a specific idea/theory/concept/product/technology/etc. For instance, *no* Wikipedia pages are terminal references. All Wikipedia pages have references to other (possibly terminal) references! Another way to view a terminal reference is as the reference where the “chain of reference” stops. A chain of reference is (for example) when someone discussing *concept A* refers to a website, which refers to a Wikipedia site on concept A, which refers to another website, which refers to a book, which refers to another book, which then refers to a scholarly journal article, which presented concept A for the first authoritative time. That journal article is the terminal reference for concept A. In some cases, websites may be terminal references, however this is rare. Another time that a website may be referenced is when the website is the official website or portal to a specific tool/technology/etc.

Websites *are not* included in the bibliography/references section. They are included as footnotes.

**Example:**

“Although the number of proteins with known structure continues to grow, the number of proteins with known sequence, but unknown structure is growing faster. Thus the gap between the number of proteins of known structure and the number of proteins of known sequence is growing. As protein structure dictates protein function, and proteins of similar sequences often have similar structure and therefore function, databases of protein sequence and structure information such as UniProt[[1]](#footnote-1) have become increasingly useful to both those who are sequencing proteins, and those that are predicting protein structure.”

**Note the footnote at the bottom of this page, corresponding to the 1 above. This is how websites should be cited.**

**End of Example**

All references other than websites should be added in MS Word as a “citation” – usually Insert > Citation, or something similar. This will give you options on how to present your references, and allow you to automatically generate your bibliography, similar to your table of contents.

# Chapter 3. Methodology

**Chapter Specific Material:**

**This chapter *begins* to explain how you accomplished your project and your objectives. Explain here what was needed to implement your project, both in technology and effort. Discuss the high-level decisions you made. These are your design decisions. Why did you choose technology x instead of technology y? Why did you choose a top-down approach instead of a bottom-up? If you chose a divide-and-conquer paradigm to a specific problem, why did you, and why did you not choose a brute-force or greedy approach? The subsections of this chapter will be specific to your project and should be discussed with your supervisor.**

**This chapter does not need specific details *about* your chosen technologies. For example, you do not need to explain what java is or what cloud computing is. What you do need to discuss is *why* you chose java, or *why* you chose a cloud platform. If you did choose java over C#, why? If you did choose cloud computing, why did you choose PaaS instead of SaaS or IaaS?**

**General Material:**

**The role of your supervisor includes the following:**

* **Guiding you in the right direction relating to your project idea**
* **Identifying and suggesting the technologies that might be useful to implement your idea**
* **Identifying and setting up project milestones and deadlines**
* **Monitoring progress, milestones and deadlines**

**Remember that you were told about your project almost a year ago, at the start of your Research Methods module. This is when your project started! The summer period is for implementing, not starting your project idea! You should check with the faculty and your supervisor regarding the demonstration and documentation submission dates. You should aim to be done well before these deadlines. You will find that once you are “done” and have removed some pressure from yourself, you will go back and make many important changes that you wouldn’t if you were rushing to meet the deadline. You will also give a much better presentation if your finished project has had some time to mature.**

**You are highly advised to keep a “progress log” while you are working on your implementation. This will be an invaluable help when you begin your documentation proper. Document everything! Document the bad decisions, the mistakes, the things that didn’t work, as well as those that did. They will all contribute to your documentation and help you answer and explain the big questions, what, why, how.**

*Chapter: Implementation*

In this chapter, I will discuss how I accomplished the objectives of my project, which is to develop a baby android app that helps new parents track their baby's feeding, diaper changes, sleep patterns, and other important information. I will explain what was needed to implement the project, including the technology and effort required. I will also discuss the high-level decisions I made in terms of design, including the reasons why I chose certain technologies and approaches.

*Technology and Effort Required*

To implement the baby android app, I needed to have a good understanding of Java programming language, Android Studio, and mobile app development. I also needed to have knowledge of database design and management, as the app would need to store and retrieve data from a database.

In terms of effort, developing a baby android app requires a significant amount of time and effort, as it involves designing the user interface, coding the app functionalities, testing the app, and fixing any bugs that may arise. I estimated that I would need to dedicate at least 150 hours to develop the app from start to finish.

*Design Decisions*

To design the baby android app, I decided to use Java programming language and Android Studio as the development environment. I chose Java because it is a widely used programming language for mobile app development, and Android Studio because it is a powerful and easy-to-use development environment specifically designed for Android apps.

For the user interface design, I decided to use a simple and intuitive design that would be easy for new parents to navigate. I also decided to use a top-down approach in the development process, where I first developed the core functionalities of the app, such as the data storage and retrieval functions, before moving on to the user interface design.

In terms of database management, I decided to use SQLite as the database management system for the app. I chose SQLite because it is lightweight, fast, and easy to integrate with Android apps.

Overall, the design decisions I made were based on the criteria of simplicity, efficiency, and ease of use for the end-users, who are new parents.

*Conclusion*

In this chapter, I discussed how I implemented my baby android app project, including the technology and effort required and the design decisions I made. I chose Java programming language and Android Studio as the development environment, SQLite as the database management system, and a simple and intuitive design for the user interface. The high-level design decisions were based on simplicity, efficiency, and ease of use for the end-users.

# Chapter 4. System Design and Specifications

**Chapter Specific Material:**

**~~This is the first chapter where you can describe specifics. What technologies did you use? What vendor/version/etc.?~~ ~~What features of these technologies made you decide to use them?~~ ~~How were they helpful?~~ ~~How were they difficult?~~ ~~What might have been better?~~ Did you have compatibility issues? Did you have any other issues?**

**You will also need to discuss and present *your* system architecture/model. How did you use your different technologies/platforms and how did they work together? Did your architecture use a tiered system? How many tiers? How are they separated both logically and in implementation?**

**In this chapter you can use architecture diagrams, code snippets, UML diagrams, formal diagrams, etc. All of these can be included as figures (see Chapter 5).**

**A note on code snippets: Code snippets should be just that – snippets. Snippets are small, core pieces of code that are integral and unique to your project. Typically a snippet is 10-15 lines of code. *Long segments of code, general structure, headers, etc. should not be included in documentation*.**

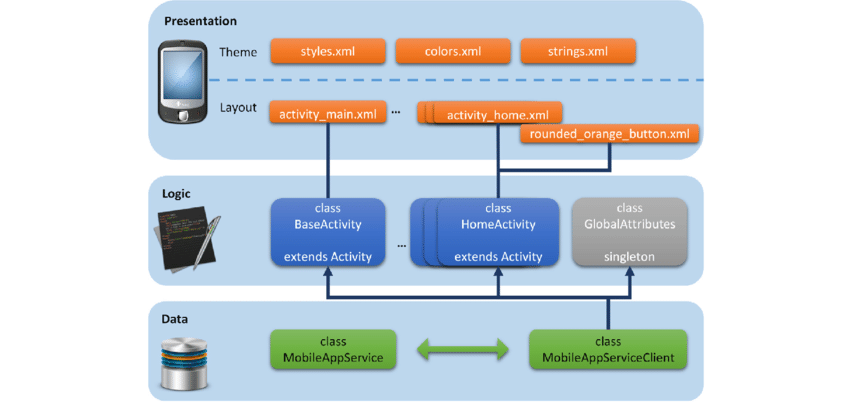
**You can also describe your process modelling (software) and data modelling here. Data modelling can include the type of input/information your system needs, the use and processing of that information, and what your system generates (output).**

For my baby app, I used Android Studio as a primary development environment and SQL as a database management system. I used Android Studio Dolphin version 2021.3.1 and SQLite.

I chose Android Studio as it is the standard development environment for creating Android apps, and it provides a powerful and intuitive interface for designing user interfaces and coding app functionality. It also has a vast range of features, including a layout editor, an emulator, and an integrated debugger, making it easier for us to test and debug our app.

SQL was chosen as our database management system as it is widely used, powerful, and flexible. SQL also provides a robust and efficient way of storing and retrieving data from the database, making it suitable for my baby app. Additionally, SQL can handle a large amount of data, which was necessary for my app as it stores information about different baby metrics.

However, I did face some challenges while using these technologies. For example, I had to ensure that our app was compatible with different versions of Android, which required testing on multiple devices with different Android versions. I also had to ensure that my app was compatible with different screen sizes and resolutions, which required us to design our user interface elements to be flexible and responsive. Unfortunately, I wasn’t able to implement a SQL Server so it could store all of its data there so anyone from any device could access that data. It still can be implemented later on.

In terms of architecture, my baby app followed a three-tier architecture model. The presentation layer was handled by the Android operating system, which provides the user interface for the app. The business logic layer was implemented using Java, which handles the app's functionality, such as data processing and calculations. The data access layer was implemented using SQL, which handles the storage and retrieval of data.

We used UML diagrams to design the architecture of our app, including class diagrams and sequence diagrams. We also used wireframes and flow diagrams to design the user interface and user experience of our app.

In terms of data modelling, our app needed to store various types of data, such as the baby's weight, height, and head circumference, as well as the baby's feeding and sleeping schedule. We used SQL to create tables for each of these data types, with appropriate data types and constraints.

Overall, while we faced some challenges, using Android Studio and SQL allowed us to create a functional and efficient baby app.

**General Material:**

Assessment and Evaluation:

*The project will be evaluated on its quality of thought, interpretation and insight as well as the contribution it makes to the field of study and the writer’s own professional development. An essential ingredient will be the student’s ability to master a technical body of knowledge and apply it to a given problem domain. The ability to think and reason with the material at issue is crucial. The design, layout, quality of expression, structure and coherence of all documentation will be taken into account when grading the finished work. The ability of the student to present and defend the material is also of significant importance.*

Marking:

Your project is marked according to Table 4.1.

|  |  |
| --- | --- |
|  | **Marks** |
| **Development Process** | 20% |
| **Interaction with supervisor** | 10% |
| **Product application (demonstration)** | 40% |
| **Documentation** | 30% |
| **Total** | 100% |

Table 4.1 Breakdown of project marking.

# Chapter 5. Implementation

**Chapter Specific Material:**

This chapter discusses specifically how you implemented the working version of your system. The specifics of this chapter should be discussed with your supervisor. Screen shots *may* be appropriate in certain circumstances in this chapter and subsequent chapters. See the note on screen shots in General Material, below.

**General Material:**

A note on Screenshots: Screenshots should be used carefully and sparingly. Only use those that are very explanatory in nature. A good rule of thumb is that if it would take many lines of text (with a footprint larger than that of the screenshot, caption, and brief text explanation combined) to explain what you want, use the screenshot/caption/brief text explanation. Otherwise just describe in text.

Tables, figures, and equations may appear throughout your documentation. All tables and figures should be centered and have captions. Captions should be inserted in MS Word with “Caption…” after selecting or right-clicking the table/figure. This will allow you to generate a list of tables and/or figures for your front-matter if desired, similar to your table of contents. For an example, see Figure 5.1.



Figure 5.1 An example figure.

Equations may also appear throughout your documentation. If you refer back to a particular equation in your documentation more than once, you should center and number the equation, allowing you to refer to it by number, and to allow you to generate a list of equations, similar to your lists of tables/figures.

**Example:**

Einstein’s famous mass-energy equivalence is given by Equation (3.1),

 **3.1**

Where *E* is energy, *m* is mass, and *c* is the speed of light. Equation 3.1 can be rearranged to an expression for the speed of light as in Equation 3.2.

 **3.2**

Equations 3.1 and 3.2 are unit independent and dimensionally consistent.

**End of Example**

Equations should be inserted into word with: (Insert > Equation, or Insert > Object > Microsoft Equation 3.0), depending on your version of Word.

# Chapter 6. Testing and Evaluation

**Chapter Specific Material:**

This chapter should include a description of the process or processes you used to test and evaluate your system. You can use things such as user experience reports, attempts by yourself or others to break your own code, graphs/charts of outputs or performance, etc. Include discussions of why things work, and why and when they don’t work. You can also include any refinements made to your implementation as a result of your testing.

**General Material:**

Your project demonstration will occur at the end of the project period. Check with your supervisor for the exact date. You will be examined by two teams, each consisting of two faculty members. You should prepare 5-8 slides briefly outlining your project idea. You do not need to go into implementation specifics in your slides. It should take no longer than 3-4 minutes to go through your slides (approx 30 seconds per slide).

Your first slide should contain the following information for the examiners:

* Name
* Student Number
* Project Title
* Supervisor Name

After your slides, you should answer any questions the examiners may have for you, and then show them your project in action. This is when you should walk through your application from a user’s point of view. After this you should be ready to have the examiners ask you to see code, explain how certain functionalities are implemented, etc. Your entire demonstration should be no longer than 20 minutes, including examiner questions. **A good recommendation for the timeline of your demonstration is the following: 5 minutes – Intro/Slides, 5 minutes – Demonstration from user’s point of view, 10 minutes – Questions from examiners, TOTAL – 20 mintues.**

# Chapter 7. Conclusions and Future Work

**Chapter Specific Material:**

The first part of this chapter should present your conclusions. A good way to do this is to take your abstract and address all of the goals and objectives stated there. Tell the reader what you achieved, and very briefly how and with what. Be sure to highlight major successes and to note limitations.

The second part is future work. This should include a discussion on what you would do if you had more time and how you would address the current limitations of your system.

This chapter should be no longer than three pages in length.

# References

This section should list your references as outlined in Chapter 2, General Material. The references section should be page-numbered, but is not a chapter and therefore should not have a number itself. It should be listed in your table of contents, and be the last thing in your document unless you have appendices.

General Material:

**Do not forget, the last things you need to do:**

1. **Spell/grammar check**
2. **Update Table of Contents, all lists, etc. (Right click on TOC or list and select “update field”, then select “update entire table”**
3. **Sign and date your declaration**
4. **Get two copies bound at a bookbinder – one hard bound and one soft bound. These are for the faculty. You can order more for yourself if you wish**
5. **Burn all documentation, code, etc. to a CD/DVD and turn this in to the faculty or supervisor with one hard bound and one soft bound copy at your demonstration.**

# Appendex I

One or more appendices may be necessary but should be approved by your supervisor. Appendices should be used for material you would like to refer to such as figures/diagrams/code/etc, but are deemed too large and bulky for the main text, or outside the “flow” of any particular chapter. Appendices should be page-numbered, and numbered with capital Roman numerals (I, II, III, …). This is not a place for large pieces of code. (There is no place for large pieces of code!) Appendices are the last section(s) in your document.

1. http://www.uniprot.org [↑](#footnote-ref-1)