Assignment 1: Individual Submission

Assignment Release Date: **16th March 2023 3:00 PM AEDT**
Assignment Submission Date: **31st March 2023 9:00 PM AEDT** (End of Week 5, Refer to Subject Handbook)
Assignment Weight: 20% of Total Subject Score (Refer to Subject Handbook)

Overview:

This is an individual assignment focusing on Project Management and Software Development Life Cycles (SDLCs) topics. This assignment aims to develop understanding of various SDLCs and their relationship to other project aspects described in the Case Study given in Appendix A.

Learning Outcomes:

By completing an analysis of the project described in the case study, students will demonstrate the ability to:

- Identify the business case to execute this project
- Identify the important risks in the project, as evident at the start of the project
- Justify the choice of two appropriate software development lifecycle (SDLC) models for this project

Submission Instructions:

Read and analyze the case study 'VR1Family Charity Aid Services' in Appendix A, and answer the questions related to the software product to be developed. A template has been provided to you for documenting your answers for this assessment. Your answers must include appropriate justifications and citations where appropriate; use IEEE citing and referencing (IEEE Reference Guide). While references in the case study have been given from general sources to facilitate a better understanding of the case study, you may use only academic references (Journal Articles, Conference Papers, Book Chapters, Official Reports) in your arguments and not general sources from the internet (not blogs, news websites, opinion pieces, information from social media etc.). An excellent source to search for any academic articles is Google Scholar.

In addition, you are required to upload the PDF version of the academic references that you cite in the assignment. Upload your assignment and the academic references as separate documents in your submission.

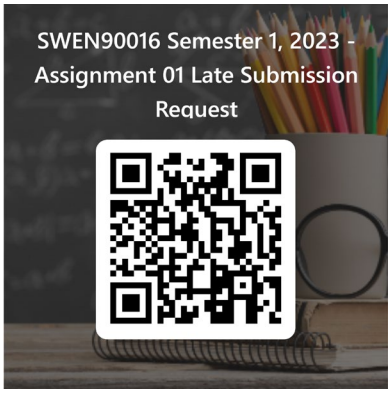
Submit your work using the Turnitin link on the Assignment tab on Canvas. From the SWEN90016 CANVAS page, select Assignments – Assignment 1 submission link from the menu. Follow the instructions and upload a PDF or DOC file, containing your responses to the questions. You have been given a template for the assignment.

The assignment submission is due at 9:00 pm AEDT sharp. Any submissions received past this time (from 9:01pm onwards) will be considered late unless an extension has been granted. There will be no exceptions. There is a mark penalty of 10% for a late project, plus an additional mark penalty of 10% per 24 hours.

Late Submissions:

If you need an extension for the project, fill This Form. Upload the supporting documentation (medical certificate, academic adjustment plan, or any other valid document in support of your request) in the form.

The form can also be accessed using the QR code given below



Academic Misconduct:

Academic misconduct by students is not permitted in any form. Work submitted by students for assessment must be their independent work. The University Policy and Procedures for Academic Misconduct can be found at: https://academichonesty.unimelb.edu.au/#policy.

The University of Melbourne's Student Academic Integrity Policy makes clear that all work submitted by an individual must be their own. Use of Artificial Intelligence Software for assessments would be construed as academic misconduct and could be subject to penalties as outlined in Academic Misconduct Penalties.

More information can be found at: Academic Integrity – Use of Artificial Intelligence Technologies

Word Count:

As a guide, the approximate length expected for this assignment is around 1700 – 1950 words (about 4 pages). This is an approximate estimate based on normal spacing in Microsoft Word, using Sans-Serif type face fonts such as Calibri or Times New Roman size 11, and about 500 words per page). The word limit excludes the cover page and references that are used in support of the arguments.

The suggested word limit guidelines are to give you an estimate about the expected length for arguments. While a good argument that exceeds the suggested word limit by a small margin will not be penalized, be mindful not to write far outside of the suggested limits as this may incur a penalty (this is at the discretion of teaching staff, whose judgement is final). Precise writing is a skill you develop as a part of academic endeavor, and it is a good practice to be concise in expressing your arguments.

Assignment Assessment Criteria:

This assignment is used to demonstrate your Intended Learning Outcomes (ILO's) 1 – 5, as specified in the Subject Handbook. The assessment will be evaluated based on the quality of analysis and overall arguments. You must use a combination of the core learning areas expected to address this assignment, PLUS demonstrate your depth of understanding in terms of the applicability of these core areas to the given case study. The assessment rubric for this Assignment can be found along with the Assignment Specifications in CANVAS.

Assessment Expectations:

Architects4U Consulting Services is a small consulting firm based in Melbourne, Victoria and has about 25 employees. Imagine you are employed as a consulting technology advisor at this firm. VR1Family Charity Aid wishes to undertake a preliminary analysis before they can start the development of a new pilot case study I.T. system, as outlined in the specifications below. Your organization Architects4U, wants to support V41Family by undertaking this preliminary analysis as a pro-bono service (work undertaken without charge). You have been tasked to prepare this preliminary analysis for V41Family, by answering the questions of this assignment.

Assignment 01 Questions

Q1 (2 Marks) – What is the business case (need) for this project. (Suggested Word Limit: 100 – 150 words)

Q2 (6 Marks) Identify two things that could go wrong in this project – otherwise known as *Risks*, resulting in the project not achieving the intended goal/s. Clearly mention the *Justification* and *Impact* that each of these risks could have on the project. (Suggested Word Limit:250 – 300 words)*

- Ensure that you identify risks that are ***unique to the characteristics of this case study***.
- If you are arguing for generic risks that can occur in any project (such as project budget or timelines), you ***must*** mention clearly why these generic risks are important in the context of this case study.
- While you are encouraged to identify both risks unique to this case study, at-least an argument for one unique risk is needed.

Generic risks that can occur in any project include project members leaving the project, or project running out of budget before completion. If you discuss on the generic risks alone (without their relation to the case study), the maximum score for this question will be capped at 2 out of 4.

Q3 (12 Marks) Discuss two different Software Development Lifecycle models (SDLCs) that you would consider for this case study. This must include the advantages and disadvantages of each of your choices, referring to specific project characteristics as outlined in the case study.
Use at least two external references to support your argument (Journal Articles, Conference Papers, Book Chapters, Official Reports). You must clearly link which Section of the case study is being supported by these external references, in your arguments. Include the relevant line numbers in the scenario description, as a part of your arguments.
Without this link between the external references and the case study in your arguments, the maximum score will be capped at 6/10. (Suggested Word Limit: 1350 – 1500 words)
Note: You are not required to choose one SDLC from your two recommendations. You are giving sufficient information for the clients to make the decision themselves, based on two SDLC's that you are arguing for.

Important Considerations:

1. Identifying the SDLC models as described in the lectures will not address the requirements of this question and will attract a low mark. Be clear and specific about how the characteristics/capabilities offered by the SDLC model *apply to the needs of this case study*. Avoid giving generic definitions or statements about the SDLC standalone.
2. You are not expected to consider any future enhancements or extensions to the case study when making your two choices of SDLC. Only focus on the current requirements.

Appendix – A

VR1Family Charity Aid Services

VR1Family Charity Aid Services started off as a small not for profit organization, founded in June 2019 by a group of 5 volunteers in a garage in Mallacoota, Australia (thanks to the generous garage space that was given by the parents of a founding volunteer member). Their focus was to provide immediate humanitarian assistance and improve the lives of people facing economic, social, and health challenges in the immediate aftermath of natural calamities in their local community. Their common belief was that every person deserved a chance to thrive irrespective of their personal circumstances. Hence, they wanted to identify communities and individuals facing the most pressing needs and provide them with the resources and support to overcome their challenges, especially in the aftermath of a natural disaster. Their first project was to collect aid and donations from community members and distribute it to people that were affected during the Australian Bushfires of 2019 – 2020[1]. Their aid work was appreciated in the local news channels as well as the international media. Their organization started getting expressions of interest from volunteers to participate and expand in their aid work in different parts of the world. The organization has also seen a steady stream of support from individuals, corporations, and governments in various forms such as receiving donation in the form of time (volunteer service), money, food / essential supply packages, and aid equipment. Since 2020, VR1Family slowly started expanding their footprint outside Australia, serving in multiple humanitarian aid assistance programs (such as Mount Sumeru volcanic eruption in Indonesia[2], flooding in Belgium and Germany[3], and the earthquake in Haiti[4]). Whether it's providing food, clothing, and shelter to families in need, or supporting health initiatives to improve access to essential medical services, the organization was always committed to making a real and lasting impact in the communities they served. Today, VR1Family is a global organization with their presence established in over 100 countries and served by a dedicated team of 15,000 volunteers. In addition to providing the standard survival kits in the event of a natural disaster (such as food, water and clothing), they have also expanded their operations to provide various types of humanitarian assistance packages such as wool and baby food, soap / textiles and toy packages, plow and farm tool packages (to facilitate self-help agricultural packages), medical supply packages and resettlement kits for refugees. VR1Family works to distribute aid directly to affected people, as well as work with partner aid agencies and government agencies to co. ordinate and support large scale aid distribution, based on the nature of the calamity.

The business structure of VR1Family is based on a hub and spoke model[5]. In this scenario, every country where VR1Family has a presence has one main ‘centralized’ warehouse that is situated very close to the main international airport that the country serves. This centralized warehouse is also called ‘The Hub’. There are multiple smaller ‘satellite depots’ across the country called as ‘Spokes’. Aid is never distributed directly to the people in need from the centralized warehouse. The central warehouse is only responsible for replenishing the stocks of the satellite depots. Each satellite depot as its own administrative team of volunteers and they are responsible for the actual activities of dispatching and distributing aid to people affected by calamities. Every satellite depot lodges a request to the central warehouse, whenever aid supplies need to be replenished. In addition, aid supplies can also be transferred between different centralized warehouses across the world. For example, if the Melbourne central warehouse in Australia has a healthy supply of dry food items and blankets,

and these items are in need due to a natural calamity in Indonesia, then the Jakarta central warehouse in Indonesia lodges a request to the central warehouse in Melbourne to send aid supplies (assuming that (i) The Jakarta warehouse does not have a stock of these essential dry food items / blankets to serve the needy in the immediate aftermath of this calamity and (ii) Melbourne Warehouse does not foresee a need for these items in the immediate future and can dispatch these items to a Jakarta warehouse that needs them immediately).

Considering that the primary focus of the organization has been aid distribution, the I.T. infrastructure at the organization is foundational. The day-to-day operations of VR1Family are primarily managed using the Microsoft Office applications (such as Word and Excel applications). More importantly, the central warehouse and satellite depots are managed by volunteer managers, most of them who are retirees and wish to serve the society.

Operations such as aid requisition from the satellite depots to the central warehouse are now tracked using spreadsheets and phone calls made between the warehouse and depot managers. In urgent scenarios, managers from satellite depots send a scanned image of hand written notes with the list of all aid items through email to the central warehouse. The same is true when aid is requested between different centralized warehouses as mentioned above (spreadsheets, phone calls and scanned notes). The current process of managing large scale aid distribution activities using spreadsheets is cumbersome. There is no way to easily see all of the aid available in the centralized warehouses across (and between) countries, so that decisions can be made faster in times of emergency scenarios. The effort is no different considering the requisition of items from the central warehouse by satellite depots. Moreover, there is no visibility and control over the distribution of aid supplies to people in need once the items are dispatched from the satellite depots to disaster-stricken areas.

The current limitations of the I.T. infrastructure at VR1Family is resulting in an overhead of 30% of the expended resources just to manage the aid distribution. In other words, about 30% of the financial donations are being spent just to manage the logistics of distributing the aid supplies. The organization feels that this overhead can be minimized to under 10% by building a new I.T. system to serve their needs. The additional overhead savings of 20% can be better utilized to support the main purpose of the organization – i.e., to serve the people in need.

During every fund-raising event involving its philanthropic donors, the organization has actively canvassed the need for a new and improved I.T. system that can minimize the operational overheads. The organization has recently convinced a philanthropic donor to support an 'initial build' of this new I.T. system. As a part of this initial build, the organization wants to implement a small pilot case study I.T. system only for the Australia region. Once the pilot case study is complete, VR1Family is confident that they can showcase the capabilities of this new I.T system thereby get multiple bigger donations to gradually roll over the functionality across other countries in a phased manner. To start with, the organization has identified the following use cases as high priority to the pilot case study. The use cases are grouped into different functional areas

Functional Area 1: Data Capture
Use Case 1 – General Information of Aid Recipients A simple user interface that captures the details of aid recipients. These details will include name of the principal recipient, age, previous address, total family members. If applicable, additional details of name of common law partner, age of common law partner, name of kids and age of kids needs to be captured. **Use Case 2 – Private Information of Aid Recipients** A simple user interface that captures the additional details of aid recipients. This includes information such as Nationality of the principal aid recipient and their family members. Information from at-least one identity

document should be captured from all the recipients from a given family (if available). For example, a national identity card number and expiry date for the primary applicants and each of their family members needs to be captured (if available). The user interface should support collecting the details of a maximum of 3 identity documents for the principal recipient as well as their family members. The user interface should also support the upload of a scanned image or photo of these identity documents (if available) in order to maintain the integrity and genuineness of the aid recipient and their family members.

Use Case 3 – General Information of Aid Donors
A simple user interface that captures the details of aid donors. These details will include name of the donor, age, mailing address, phone number (either of a land line number or a cell phone number) and an e-mail address. The UI should also capture a preferred mode of communication for future fundraising events. In case of a donor organization, the name of the organization, the address of its headquarters, and the name of the principal contact person should be captured as additional information.

Use Case 4 – Private Information of Aid Donors
A simple user interface that captures the additional details of aid donors. This includes information such as Nationality of the donor. At-least one identity document information of the donor should be captured. For example, a national identity card number and expiry date for the donor. The user interface should support the collecting the details of a maximum of 3 identity documents. In addition, if the donor is an organization, the business registration details should be captured (for pilot phase – The Australian Business Number of donor organization).

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Functional Area 2: Information Setup for Aid Items

Use Case 5 – Creation of Aid Categories and Kits
A simple user interface to create various aid categories. Some of the aid categories currently being served are Dry Food Items, Hot Food Items, Personal Hygiene, Warm Clothing, Casual Clothing, Bedding, Footwear, Electrical Supplies and Furniture Supplies. Each aid category should also have an overall status indicating its Inventory Status (Low / Medium / High / Excess) that can be used by the satellite depots when making an aid request. In the future, this can also be used to request aid by other central warehouses. Similarly pre-defined 'Kit' categories need to be defined. A kit is a pre-defined combination and quantity of specific items. For example, a warm clothing kit could have two pairs of woollen socks, two large sized woollen shirts, and a large blanket.

Use Case 6 – Creation of Aid Items
A simple user interface to track various aid items. Each aid item should be assigned to an aid category. They could optionally be assigned to pre-defined aid kits (as per Use Case 5). In addition, expiry dates, main ingredients and allergen information should be documented for all food items. All clothing items should have a size with support for both numeric and alphabetic values (such as XL, XXL). Brand of the food manufacturer and the quantity of items available should be captured. All items should have a name, category, and quantity.

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Functional Area 3: Aid Receiving and Distribution

Use Case 7 – Requisition of items from Aid Recipients

A simple user interface that captures the specific requests of aid items from recipients. The recipient can either request pre-packed aid kits (such as basic survival kit that contains warm clothing and personal hygiene items, or an adult vegetarian food kit that contains three vegetarian meals) or request individual items. Each individual item should be selected from a pre-defined category. For example, under the dry food category, recipients should be able to choose items such as Biscuits, Crackers, Cereals, Chocolates and Dry Fruits (to name a few). There should be a provision to record the quantity for each item and document some notes for the requisition.

Use Case 8 – Receiving of items from Aid Donors
A simple user interface that documents aid items received from donors. The user interface should have a provision to select the donor created using Use Case 3 as well as the individual items that are donated by the donor. The items should be pre-populated and assigned to categories (based on Use Case 5 and 6)

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Functional Area 4: Optical Character Recognition Support

Use Case 9 – Optical Character Recognition and Conversion
Support for an Optical Character Recognition API[6, 7] that can automatically extract text, handwriting and data from scanned documents. Here the user interface should have a feature to input the scanned image sent by satellite depot manager requesting for aid items. Individual data elements should be extracted and presented for review on the UI. For the pilot phase, individual data elements will be used to manually create an aid item requisition, similar to Use Case 7. Here, instead of the aid recipient, the satellite depot manager is sending the request for aid (and possibly for multiple items with larger quantities).

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Functional Area 5: Dashboard View

Use Case 10 – Aid Distribution Dashboard
A simple dashboard that is also the default User Interface to be displayed when the user logins into the system. The dashboard displays 4 graphs in a 2 X 2 layout (2 rows with 2 graphs displayed in each row). The first graph displays the Top 10 items that have been distributed as aid in the last 90 days. The second graph displays the Top 5 Item categories that have been distributed as aid in the last 90 days. The third graph displays the Top 5 items that have a low inventory (and needs to be requested from the central warehouse). The fourth graph displays the Top 5 items that have been donated in the last 90 days by donors / donor organizations. The user should have an option to display the choice of the graph type (bar charts or pie chart) for each graph. The dashboard should only be displayed if the user is logged into the system as an "admin" user (refer Use Case 18).

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Functional Area 6: Social Media Integration

Use Case 11 – About Us Page
A static page that shows briefly mentions the history, achievements, and the philanthropic activities of the organization. The UI should support different content types such as text, images, audio and video files.

Use Case 12 – Link to Social Media Profile
The User Interface for "About Us" requirement documented in Use Case 11 shall have two "Follow Us" buttons. The first button will transfer the logic to the Facebook Profile Page of the Charity Aid that showcases the

philanthropic and fund-raising event details. The second button will do a similar activity for the Instagram Profile page of the Charity Aid.

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Functional Area 7: Security Considerations

Use Case 14 – Secure Hosting

The new I.T. System shall be securely hosted to prevent hacking from unscrupulous actors (HTTPS pages)

Use Case 16 – Restricting the number of login attempts

In order to prevent hacking and malicious users from accessing the web site, the number of wrong logins attempts to the web site shall be restricted. After a pre-defined number of attempts, the user shall not be able to access the web site for a pre-defined time period. The pre-defined attempts and the lock out time period shall be configurable by the end user of the system.

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Functional Area 8: Print and e-mail Support

Use Case 13 – Print Functionality

The new I.T. system shall provide a functionality for customers to print the "About Us" page in a PDF format

Use Case 17 – email functionality

The system shall send an email to the aid recipient as soon as aid is requested by the donor. The email shall also be sent to the respective donors and recipients when registrations for new donors and recipients are undertaken in the new system.

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Functional Area 9: Text to Speech Integration

Use Case 15 – Alternate Mode for Requisition of Aid Items

Volunteers shall be able to request aid items using speech. To start with, implement a "Speech to Text" functionality to transcribe volunteer speech requesting aid items into text. Store this text in a database with Volunteer information (such as name, Volunteer ID, Warehouse where the volunteer works) and the text transcription of the message as one record. You are ***not*** expected to convert the text transcription into an aid request as done for Use Case 7.

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Functional Area 10: Administrator User

Use Case 18 – Administrator User

The system shall have a pre-defined "admin" user created. Only the admin user should be able to view the dashboard (Use Case 10). The "admin" user can also act as a volunteer. In other words, the "admin" user shall be able to perform all the use cases and view the dashboard.

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Common Expectations for all the Use Cases

The user interface element validations for all the use cases should be as per standard practice, to minimize data entry errors. The new I.T. system will be accessed by employees and volunteers recruited by VR1Family only. Aid recipients and external actors do not have access to this new I.T. system. Also, during this pilot phase, only employees and volunteers working in Australia can access the new system. VR1Family have planned a budget of about 20,000 dollars to build the pilot case study I.T. System. They expect this pilot system to be built by a 4-to-6-member team in about 6 weeks. Considering the low budget, they have also indicated that they plan to engage the students of The University of Melbourne to assist them in the development of this pilot project.

Case Study References:

[1] - 2019-2020 Australian Bushfires - Center for Disaster Philanthropy
[2] - Indonesia: Semeru Volcano - Dec 2021 | ReliefWeb
[3] - Assessment of the 2021 summer flood in Central Europe | Environmental Sciences Europe
[4] - 2021 Haiti Earthquake and Tropical Storm Grace - Center for Disaster Philanthropy
[5] - What is a Hub and Spoke Distribution Model? – Redwood Logistics : Redwood Logistics
[6] - Amazon Textract | AWS Machine Learning Blog
[7] - Computer Vision | Microsoft Azure