Canterbury Institute of Management (CIM)

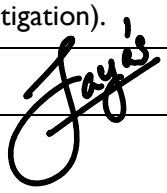
ASSESSMENT COVER SHEET

1. Personal Details			
Student ID	**Given Name(s)**	**Surname**	**Email Address**
1. CIM12137	Ayesh Chathuranga	Jayasekara	cim12137@ciom.edu.au
Campus	Darwin Campus		
Course Title and Code	MSIT401 System Development Methodologies		
Assessment Title	Reflective Journal - *Week 9*		
Due Date & Time	01/12/2024		
Course Lecturer/Tutor Name: Sharad Neupane		Assessment Word Count (if applicable): 507	

2. Student Declaration

By signing and submitting this coversheet, I/we declare that:

- ✓ This assessment submission is my/our own work unless otherwise acknowledged (including the use of generative AI tools) and is in accordance with the Institute's ***Academic Integrity and Honesty Policy*** available on the website.
- ✓ No part of this assessment has been submitted previously for advanced standing or academic credit in this or any other course.
- ✓ I/we certify that we have not given a copy or have shown a copy of this assessment item to another student enrolled in the course, other than members of this group.
- ✓ I/we are aware that the Lecturer/Tutor of this assessment may, for the purpose of assessing this assessment task communicate a copy of this assessment task to a plagiarism checking service to detect possible breaches of academic integrity, for example, plagiarism, recycling, cheating, contract cheating, or unauthorised use of generative AI (which may then retain a copy of the item on its database for the purpose of future investigation).

Signature:		Date:	20/11/24

Canterbury Institute of Management
63 Oxford Street, DARLINGHURST NSW 2010 | 21 Regent Street, REDFERN NSW 2016 | 2 Printers Place, DARWIN CITY NT 0800 | 399 Lonsdale Street, MELBOURNE VIC 3000
Phone: +61 2 8007 5846 | Website: https://ciom.edu.au/
TEQSA Provider ID: PRV14258 | CRICOS Provider Code: 03809A

MSIT401 System Development Methodologies

Reflective Journal - *Week 9*

Ayesh Jayasekara - CIM12137

Data Structures

Any IT solution depends on data. Ultimately these systems consumes data as input, process them and produce an output which can be classified as information which can be used to make decisions. The data structures defines how these data are logically stored while being processed.

Database Management Systems

A collection of software tools to help manage the storage & retrieval of data is effectively a database management system. These systems help to store large amount of data in either relational or object form.

Some examples include MySQL, MSSQL, Oracle SQL, MongoDB ect.

Database Terminology

In the context of databases some key terms are used to refer various data models such as,

- Entity - Actual real life object
- Table - Physical data structure the data is stored to
- Attribute - Atomic metadata of an entity
- Record - A collection of attributes that hold interrelated data
- Primary Key - Unique attribute that can be used to identify a record individually
- Candidate Key - Other unique attributes that can still be used to identify a record except chosen primary key
- Foreign Key - When a relationship if formed between two entities primary key that is linked to origin is referred as foreign key
- Alternative Key - Other keys or collection of keys that can be used to retrieve records
- Referential Integrity - The ground rules that keeps referenced data consistent across inserts, updates & deletions

Entity Relationship Diagrams & Normalization

Complex information systems often requires complex data stores. This leads to the need of graphical representation of a data scheme in much simpler and universal symbolism. The entity relationship diagram captures entities, their attributes and relationships along with cardinalities and total/partial participation features in to a universal diagram that can be read by number of people but interpret same meaning.

Normalization

Once the entities and their relationships are identified, we must make sure that data is stored efficiently and no duplicates are present within the schema to ensure optimal performance and accuracy. The process of normalization helps to decompose complex data collections to multiple sub structures.

Normalization can be done upto many levels, but common use cases achieve optimal structures at third normal form. The three levels of normalization can be listed as,

1. **First Normal Form:** - Ensures that all attributes are atomic and not redundant
2. **Second Normal Form:** - Eliminates partial dependency between non-key attributes
3. **Third Normal Form:** - Further eliminate transitive dependencies so that all non key attributes explicitly depends on only primary key

Concepts In-Action

In real life challenges, it is vital to get the database schema accurate to avoid expensive design mistakes that may sometimes decide success or failure of a new system. Therefore, the correct process of designing the database must be followed.

According to (Zygiaris, 2018), This starts from correctly drawing an Entity Relationship Diagram and then converting it to normalized schema followed by applying at least 3 levels of normalization. It must be noted that evolving from un-normalized to third normalization must not skip any level of normalization as each level depends on correct execution of previous level.

Bibliography

Zygiaris, S. (2018). *Database Management Systems* [https://www.perlego.com/book/721827 (visited 2024-11-26)]. Emerald Publishing Limited.