COMM1822

Term 2 2022

Introduction to Databases for Business Analytics

Week 7 Database Development Process

Lecturer-in-Charge: Kam-Fung (Henry) Cheung
Email: kf.cheung@unsw.edu.au
Tutors: Theresa Tran
Liam Li Chen
Kathy Xu
PASS Leader: Srilekha Chandrashekara Kolaki

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Copyright

- There are some file-sharing websites that specialise in buying and selling academic work to and from university students.

- If you upload your original wor   other student downloads
and presents it as their own eit **it ut be found guilty of collusion — even years after graduatio**

- These file-sharing websites may also accept purchase of course materials, **such as copies of** <u>**lecture slides**</u> **and** <u>**tutorial handouts**</u>**. By law, the copyright on course materials, developed by UNSW staff in the course of their employment, belongs to UNSW. It constitutes copyright infringement, if not academic misconduct, to trade these materials.**

Acknowledgement of Country

UNSW Business School acknowledges the Bidjigal (Kensington campus) and Gadigal (City campus) the traditional custodians of the lands where each campus is located.

We acknowledge all Aboriginal and Torres St Islander Elders, past and present and thei communities who have shared and practiced their teachings over thousands of years including business practices.

We recognise Aboriginal and Torres Strait Islander people's ongoing leadership and contributions, including to business, education and industry.

UNSW Business School. (2022, May 7). *Acknowledgement of Country* [online video]. Retrieved from https://vimeo.com/369229957/d995d8087f

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

UNSW
SYDNEY

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

W7 Learnings Outcomes

Business Intelligence

Database Development Assignment Project Exam Help
- ❑ Information systems develo
- ❑ Software development lifec https://eduassistpro.github.io/
- ❑ Database development lifecycle (DBLC)
- ❑ **Interaction** between **SDLC** and **DBLC** Add WeChat edu_assist_pro

Database Professional Roles
- ❑ **Database Administrator (DBA)** vs. **Data Administrator (DA)**
- ❑ DBA **tasks**
- ❑ DBA **ethics**

Business Intelligence (BI)

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Source: cio.com

Chapter 13

Intelligence and rehouses

1-2

Business Intelligence (BI)

Comprehensive, cohesive, integrated set of tools and processes

❑ Captures, collects, integrates, stores, and analyzes data

❑ Generates and present business decision making

Allows a business to transform:

| Data | → | Knowledge | → | Wisdom |

Business Intelligence (BI)

Concepts, practices, tools and techniques to help business

❑ Understand its core capabilities

❑ Provide snapshots of the company situation

❑ Identify key opportunities t   tage

Provides a framework for

❑ Collecting and storing operational data and   into decision support data

❑ Analyzing decision support data and presenting generated information to end users to support business decisions

❑ Making business decision which generates more data

❑ Monitoring results to evaluate outcomes and predicting future outcomes with a high degree of accuracy

Business Intelligence (BI)
vs.
Business Analytics (BA)

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Source: https://www.betterbuys.com/bi/business-intelligence-vs-business-analytics/

Business Intelligence (BI)
vs.
Business Analytics (BA)

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Source: https://www.betterbuys.com/bi/business-intelligence-vs-business-analytics/

Mark van Rijmenam
CEO / Founder
BigData-Startups
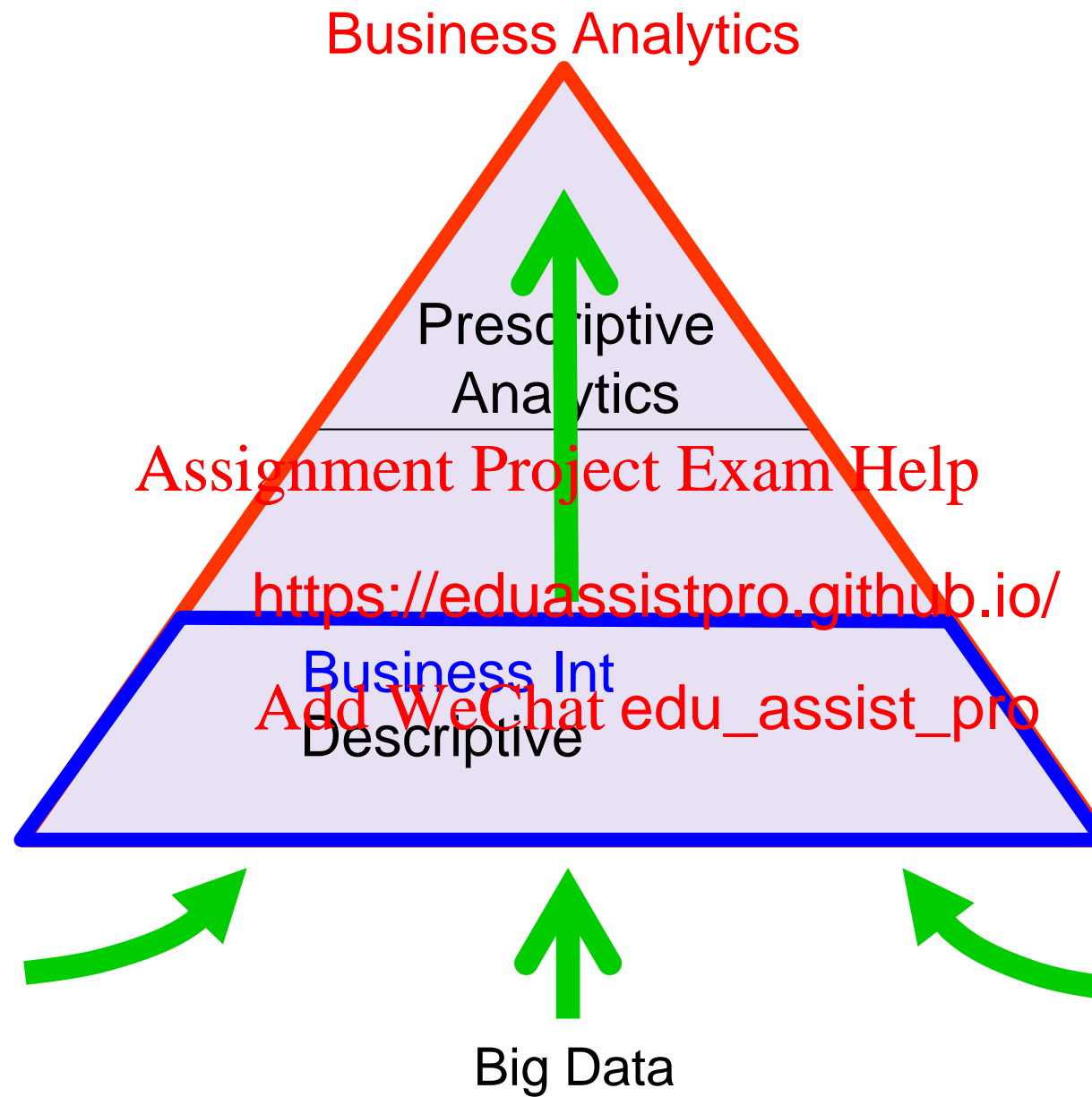
Business Analytics

Prescriptive Analytics

Assignment Project Exam Help

https://eduassistpro.github.io/

Business Int

Add WeChat edu_assist_pro

Descriptive

Big Data

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

TABLE 13.3

SAMPLE OF BUSINESS INTELLIGENCE TOOLS

TOOL	DESCRIPTION	SAMPLE VENDORS

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

A **dimension** is a structure that categorizes facts and measures in order to enable users to answer business questions. Commonly used dimensions are people, products, place and time.
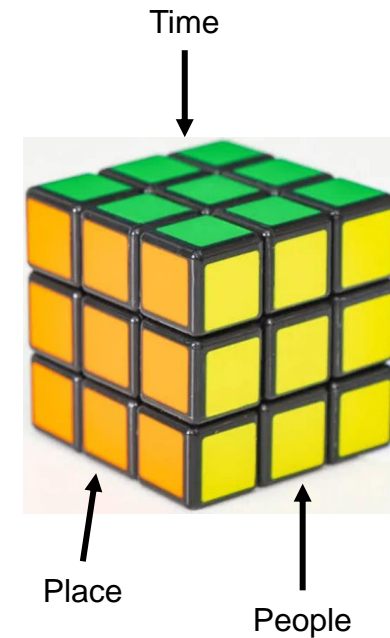
Database Development

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

UNSW
SYDNEY

Chapter 3

Design

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Information Systems

Information Systems (IS) are systems that use IT to capture, transmit, store, retrieve, manipulate or display information used in one or more business processes.

Assignment Project Exam Help

Important issues when building
- ❑ The system must **solve the ri**https://eduassistpro.github.io/
- ❑ The system must be **built in t**
- ❑ The system must **fit into the existing environm**
- ❑ The system must **be easy to use** (e.g., smartph Add WeChat edu_assist_pro

The performance of an IS depends on several factors:
- ❑ Application design and implementation (front-end).
- ❑ **Database design and implementation (back-end).**
- ❑ Administrative and organizational procedures.

Information Systems

❑ **System analysis** is the process that establishes the need for and the extents/scope of an information system.

❑ The process of cre system is known as **systems development**...

❑ **Database design** takes place within the context and limits of an information systems development process.

Evolution of Software Development Process Models

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Code & Fix Model

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

UNSW
SYDNEY

Stagewise/Waterfall Model

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Scrum/Agile Development Model

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Scrum/Agile Development Model

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

The Plan

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

The Reality

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

The Result

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Software Development Lifecycle (SDLC)

Waterfall
Model
Phases

```
Planning
Analysis
Desig
Implementation
Maintenance
```
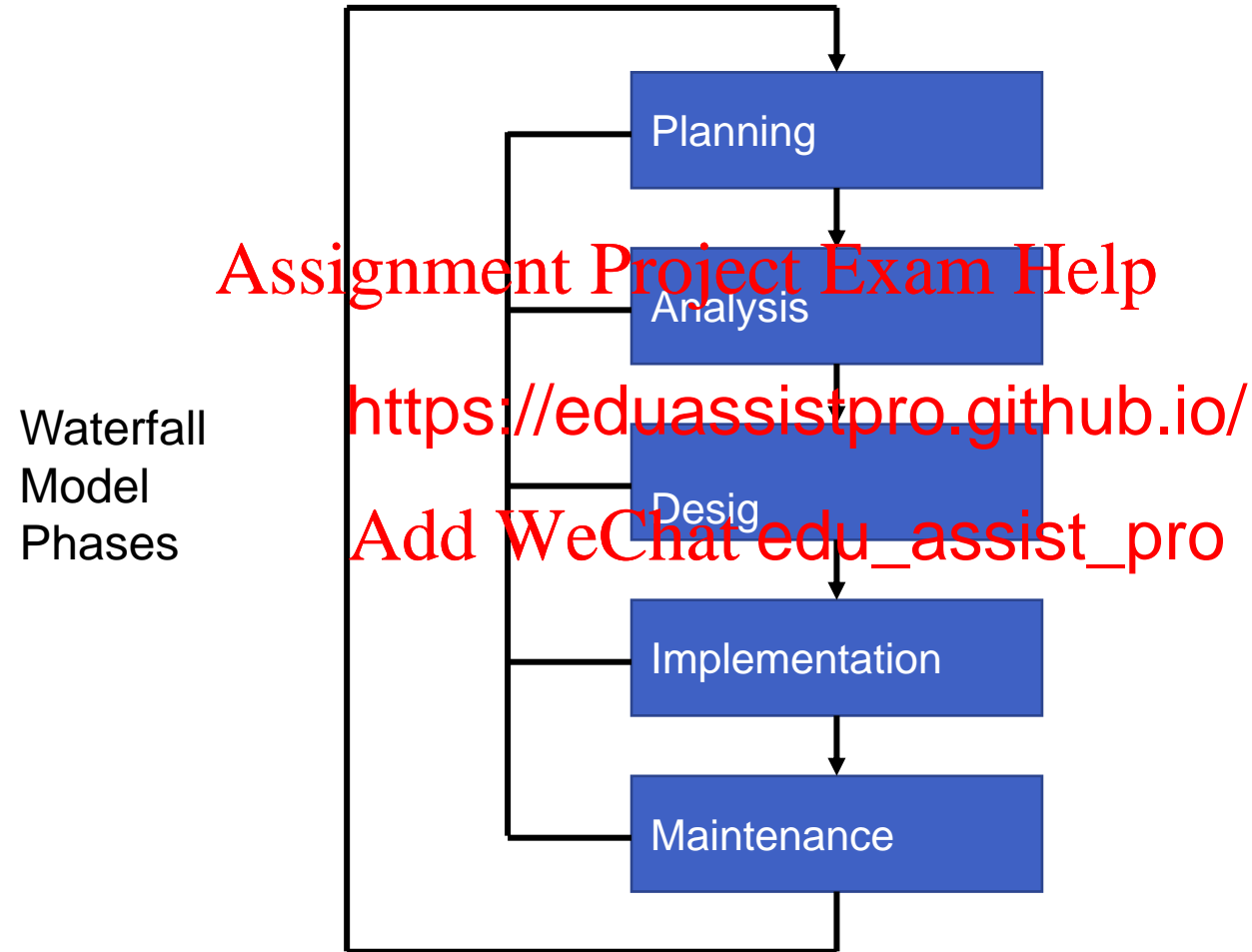
SDLC

Planning

❑ General overview of the company and objectives

❑ Initial assessment

❑ Feasibility of a new sy

Analysis

❑ User requirements

❑ Existing system evaluation (How do these requirements fit into overall system?)

❑ Logical system design

SDLC

Detailed System Design
❑ Completion of design which includes screens, menus, reports, etc.
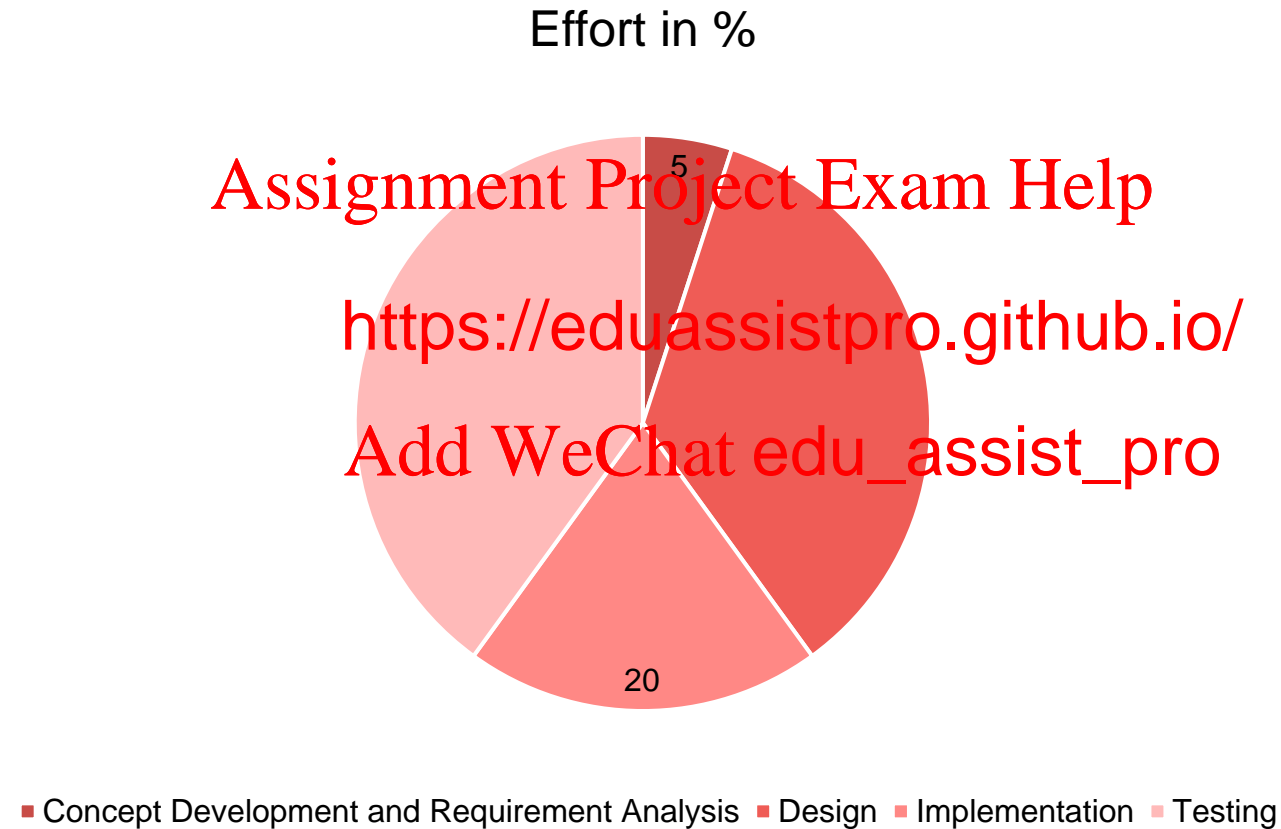
Assignment Project Exam Help

Implementation
❑ Cycle of coding, testing
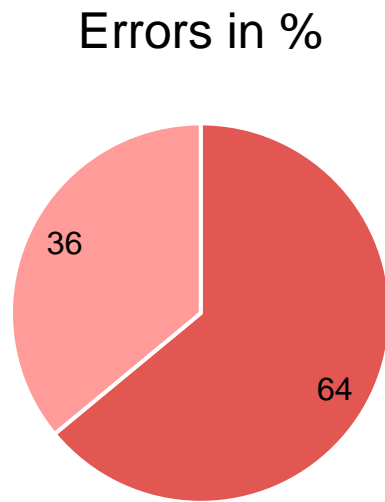❑ Installation, fine-tuning

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Maintenance
❑ Evaluation
❑ Maintenance
❑ (Minor) Enhancement

Distribution of Effort for Product: Initial Development

Effort in %

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

■ Concept Development and Requirement Analysis ■ Design ■ Implementation ■ Testing

Typical Errors in a Product

Errors in %

36

64

- ■ Requirements Specification and Design Errors
- ■ Implementation Errors

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Much better to discover the error in its early stage(s)!

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Database Lifecycle (DBLC)

❑ Also called Database Development Lifecycle (DDLC)

Assignment Project Exam Help

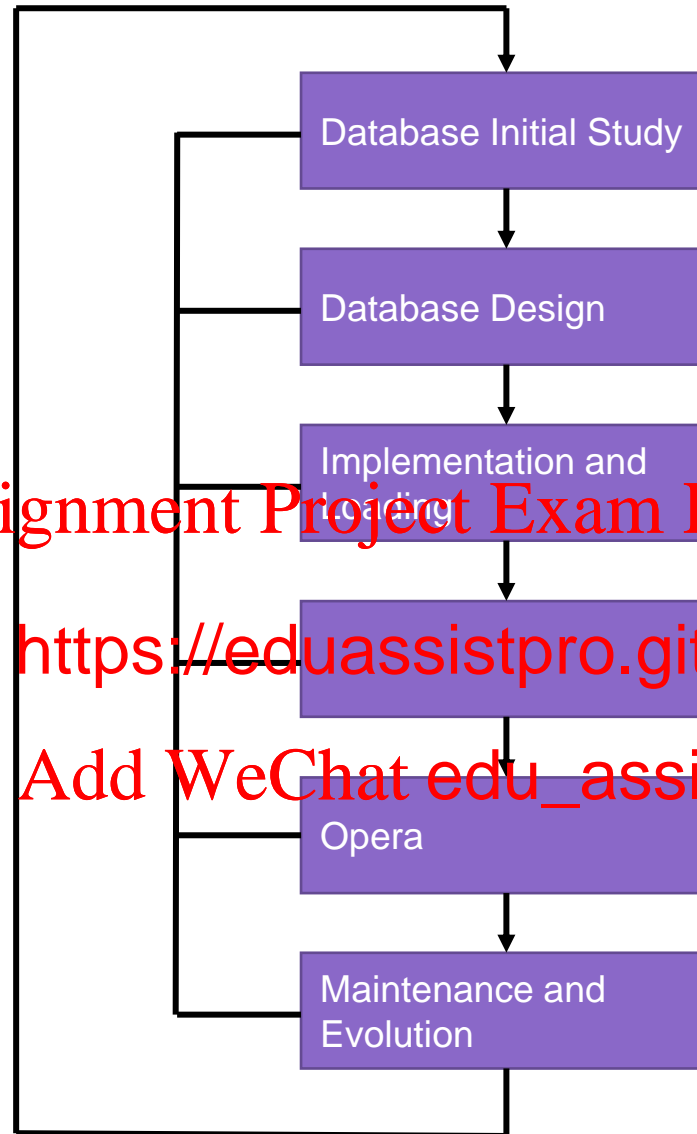❑ Part of/subset of/e   ms/software development lifecy   https://eduassistpro.github.io/

Add WeChat edu_assist_pro

❑ Six phases (see next slide)

Database Lifecycle

Database Initial Study

Database Design

Implementation and loading

Opera

Maintenance and Evolution

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

DBLC Phase 1: Database Initial Study

Analyzing the organization
- ❑   Objectives, Operations & Structures

Defining problems and constraints
- ❑   Function of existing systems
- ❑   Input of existing systems
- ❑   Output of existing systems

Defining objectives
- ❑   Initial objectives
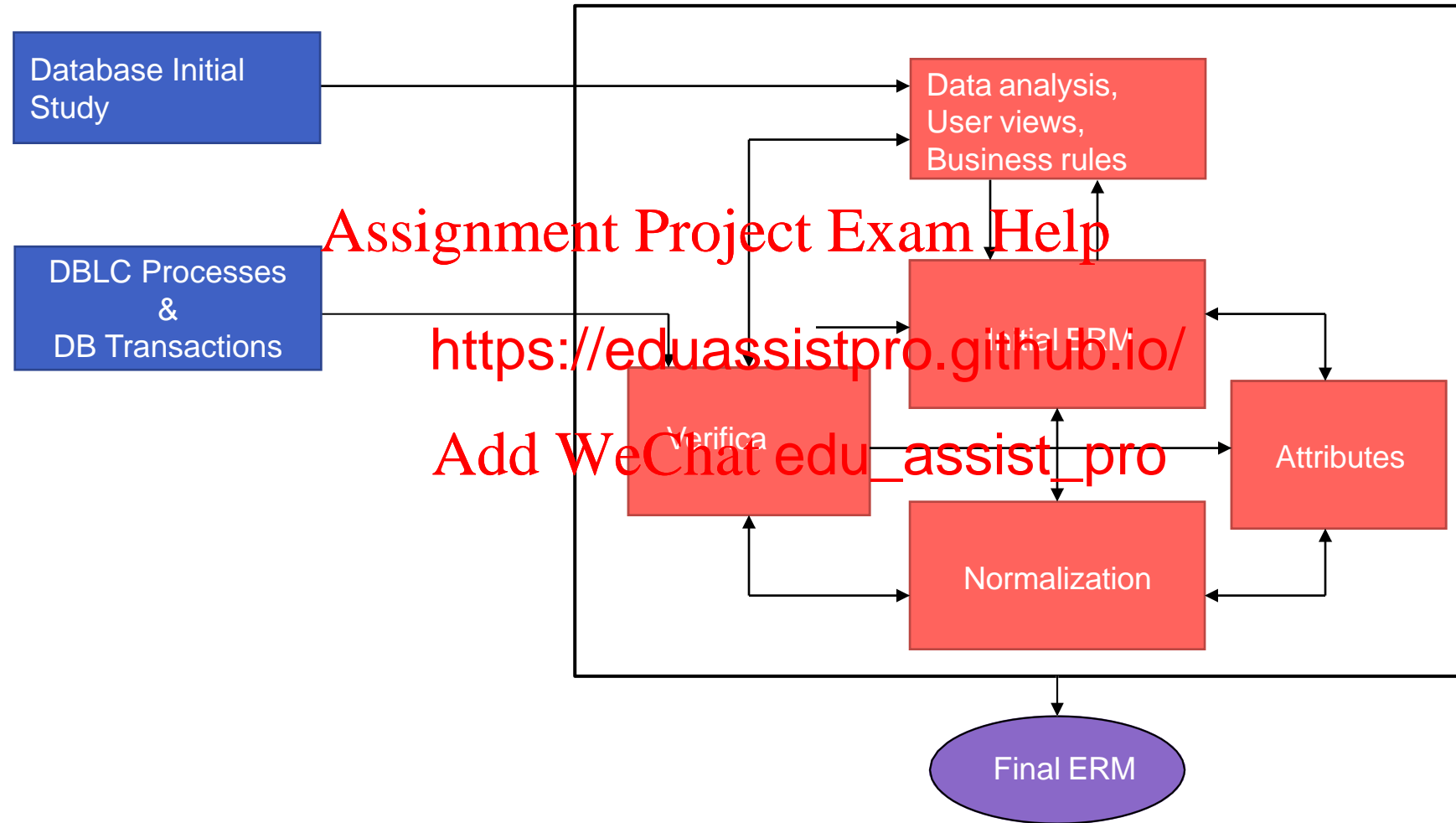- ❑   Data sharing and interfaces with other systems

Define scope and boundaries
- ❑   DB design for which part of the organization?
- ❑   What hardware will be used?

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Iterative ER Modelling Process

Database Initial Study

DBLC Processes & DB Transactions

Data analysis, User views, Business rules

Initial ERM

Verifica

Attributes

Normalization

Final ERM

DBLC Phase 2: Database Design

Conceptual Design

☐ **Data analysis and data requirements**
   a. What are the end-user views needed?
   b. What are the inputs and outp
   c. What are information is need

☐ **ER modelling and normalization**
   a. What are the business rules?
   b. What are the entities, attributes and relationships for ER diagram?
   c. What are the keys?
   d. Do we need to normalize?

☐ **Model verification**

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

DBLC Phase 2: Database Design

Logical Design
❑ Translating/mapping the conceptual design into internal model of a selected DBMS (e.g., Oracle, Access, MySQL etc.)

Physical Design

❑ Defining data access charac   indexes).
❑ Optimizing performance (e.g., choice of storag

Resources for Implementation
❑ DBMS
❑ Hardware

Note: Logical and physical design can be carried out in parallel activities, but requires high level of understanding of software and hardware.

DBLC Phase 3: Implementation and Loading

Core tasks:
- ❑ Creating DB
- ❑ Assigning permission to a Database Administrator (DBA)
- ❑ Creating tables within DB
- ❑ Assigning permission to use

Further areas needing attention:
- ❑ Performance (hardware, software, indexes, buf
- ❑ Security (physical security, password security, access rights, audit trails, data encryption, diskless workstations)
- ❑ Backup and Recovery
- ❑ Data Integrity Company Standards
- ❑ Concurrency Control (allowing simultaneous access to a DB while preserving data integrity)

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Database Security and Data Privacy

Database security is to ensure that only authorized users can perform authorized activities at authorized time.
- ❑ Authentication → user has the basic right to use the system.
- ❑ Authorization → user has th   on the system.

Data privacy (or informatio   ip between collection and dissemination of data, technology, the publi   st of privacy and the legal and political issues surrounding them. Priva   exists wherever **personally identifiable information (PII)** is stored. There are several wide range of sources where data privacy issues can arise, for example:
- ❑ Healthcare records
- ❑ Financial institutions and transactions
- ❑ Criminal justice investigations

DBLC Phase 4: Testing and Evaluation

❏ Testing **performance** / performance fine-tuning

❏ Testing **security constraints**

❏ Testing **integrity**

❏ Testing **concurrent access**
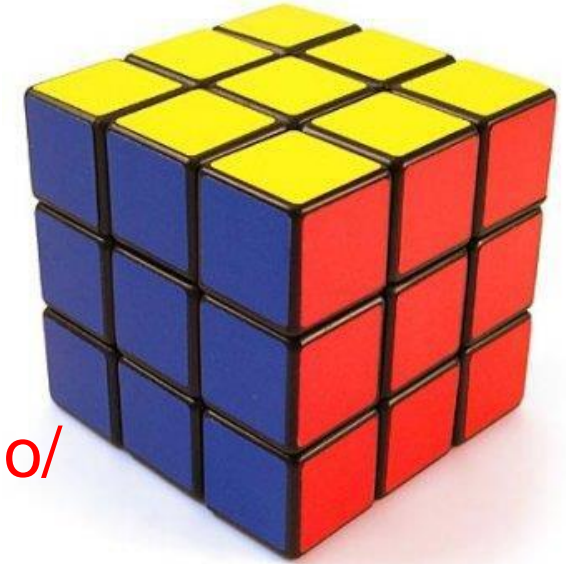
DBLC Phase 5: Operation

❑ DB (and application) completed

❑ "Going into production/operation"

❑ Running information s

❑ Users and applications start to insert, receive, update and delete data…

❑ DBA starts to (ongoing) fine-tune performance, allocate storage space, control access, backup data…

DBLC Phase 6: Maintenance and Evaluation

DBA has responsibility for routine maintenance activities within the DB:

- ❑ **Preventive** maintenan
- ❑ **Corrective** maintenan
- ❑ **Adaptive** maintenance (enhancing performance, adding entities, adding attributes, etc.)
- ❑ Access control, statistics, auditing, periodic system-usage summaries, etc.

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

DBMS and Organisational Change

DBMS is a **software package** with computer programs that control the creation, maintenance and use of databases (e.g., Oracle).

The introduction of a DBM   y affect the organization in various ways.

When a new DBMS is introduced to an o   , three important aspects have to be addressed.

❑ **Technological**: DBMS hardware and software
❑ **Managerial**: Administrative functions
❑ **Cultural**: Corporate resistance to change

Database Administrator (DBA)

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Source: dbadave.co.uk

Chapter 16

Assignment Project Exam Help

Administration

https://eduassistpro.github.io/

rity

Add WeChat edu_assist_pro

1 -5

Database Administrator (DBA)

Database Administrator (DBA): A technical function that is responsible for physical database design and for dealing with technical issues such as security enforcement, database performance, backup and recovery.

Data Administrator (DA) at is responsible for the overall management of data resources zation, including maintaining corporate-wide definitions a s. The DA is responsible for controlling the overall company data resource.

The DA's job description covers a larger area of operations than the DBA's.
(DA → Data Governance Lead/Manager)

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

DBA

❑ The DBA is responsible for the control of databases.

❑ The role of DBA va nies.

❑ The location of the DBA varies (e company management).

❑ Larger corporations make a distinction between DBA vs. DA.

DBA Tasks/Responsibilities

❑ **Installing** and upgrading the **database server**
❑ **Allocating** system **storage** and planning future storage
❑ **Modifying** the database structure
❑ **Enrolling users** and ma
❑ **Ensuring compliance**
❑ **Controlling** and monitoring **user acces**
❑ **Monitoring** and optimizing the **perform**
❑ **Planning** for **backup** and **recovery**
❑ **Maintaining archived data**
❑ **Backing up** and **restoring databases**
❑ **Contacting database vendor** (e.g., for technical support)
❑ **Generating various reports**

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Source: Oracle

DBA Ethics

Responsibilities to Company:

❑ Follow internal standards and regulations.

❑ Inform openly about issues, provide complete information, do not create knowledge silo.

❑ Ensure up-to-date security, have recovery plan in place.

Responsibilities to Externals:

❑ Follow external regulations.

❑ Protect externals from inappropriate d

❑ Ensure privacy through authorization and security.

Responsibilities to Co-Workers:

❑ Be honest and open with co-workers.

❑ Protect co-workers from inappropriate data use.

❑ Share, teach and help grow the collective knowledge base

Responsibilities to One's Self:

❑ Stay up to date on industry and technology.

❑ Stay up to date on regulations.

❑ Learn new techniques, new tools and best practices.

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Source: DBA Code of Ethics

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Questions

Assignment Project Exam Help

https://eduassistpro.github.io/

Add WeChat edu_assist_pro

Source: petcare.com.au