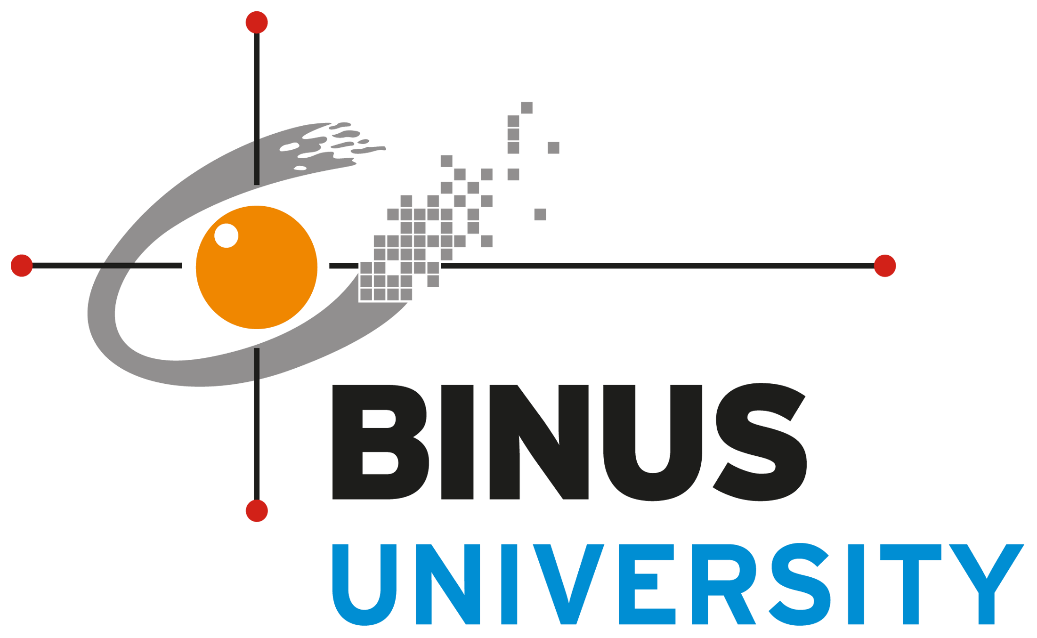
**PERANCANGAN DATABASE UNTUK LEARNING MANAGEMENT SYSTEM**

LAPORAN PROYEK AKHIR

MATA KULIAH

ISYS6028 – DATABASE SYSTEMS

BA20 – LAB



Disusun Oleh:

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Semester Ganjil 2020 – 2021

MALANG

# LEMBAR PERSETUJUAN PROYEK AKHIR

**PERANCANGAN DATABASE UNTUK LEARNING MANAGEMENT SYSTEM**

MATA KULIAH ISYS6028 – DATABASE SYSTEMS

KELAS BA20 - LAB

Semester Ganjil 2020 / 2021

Laporan akhir proyek di atas adalah benar karya dari :

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**2301927872 2301942242 2301881852**

**Malang, …… - ……………. ……..**  **Malang, …… - ……………. ……..**

**(FRIHANDHIKA PERMANA)**  **(WINA PERMANA SARI)**

**D6371**  **D5975**

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# BAB 1 PENDAHULUAN

## 1.1 Latar Belakang

Perkembangan teknologi pada era modern ini memungkinkan adanya inovasi-inovasi baru dalam bidang teknologi informasi. Salah satu bidang yang dapat dibantu dengan adanya perkembangan teknologi informasi adalah dalam bidang pendidikan. Salah satu bentuk inovasi teknologi informasi dalam bidang pendidikan adalah adanya Learning Management System (LMS) berbasis website dan aplikasi. Pengunaan LMS ini dapat membantu siswa dalam pembelajaran jarak jauh (PJJ) terutama untuk mengakses materi, tugas, dan informasi yang berkaitan dengan pembelajaran secara online.

Di tengah pandemi COVID-19 yang melanda di dunia, bidang pendidikan terdampak secara tidak langsung. Pendidikan di Indonesia sebelum pandemi COVID-19 banyak sekali bergantung kepada metode pembelajaran tatap muka mulai dari tingkat PAUD sampai dengan tingkat Universitas. Akibat adanya pandemi COVID-19 ini Kementerian Pendidikan dan Kebudayaan (Kemendikbud) menerbitkan Surat Edaran Nomor 4 tahun 2020 tentang Pelaksanaan Kebijakan Pendidikan Dalam Masa Daurat Penyebaran Coronovirus Disease (COVID-19) dan Surat Edaran Nomor 15 tahun 2020 tentang Pedoman Penyelenggaraan Belajar Dari Rumah Dalam Masa Darurat Penyebaran Covid-19 [1, 2]. Dengan adanya pandemi COVID-19 ini sistem pendidikan harus memiliki kesiapan untuk pelaksanaan pendidikan jarak jauh yang optimal.

Dalam pembuatan LMS berbasis website dan aplikasi dibutuhkan desain database yang baik sehingga proses pembelajaran tidak terganggu. Database yang dibuat harus dirancang dengan baik agar dapat menunjang aktivitas pembelajaran online. Apabila database tidak dirancang dengan baik maka hanya menjadi penghambat aktivitas pembelajaran online. Selain itu database yang dibuat juga harus didesain dengan baik untuk memberikan kemudahan bagi mahasiswa untuk mengakses materi serta bagi dosen untuk memberikan materi.

## 1.2 Rumusan Masalah

Berdasarkan latar belakang yang telah dijabarkan diatas maka rumusan masalah dapat disimpulkan sebagai berikut:

1. Bagaimana cara merancang database yang dapat mendukung pembelajaran online ?
2. Bagaimana desain database yang tepat dapat mendukung pembelajaran online ?

## 1.3 Tujuan Penelitian

Dari latar belakang dan rumusan masalah di atas, tujuan dari penelitian sebagai berikut:

1. Merancang database yang dapat mendukung pembelajaran online bagi mahasiswa dan dosen.
2. Membuat desain database yang sesuai dengan kebutuhan pendidikan online atau jarak jauh.

## 1.4 Manfaat Penelitian

1. Bagi Mahasiswa, mempermudah akses mahasiswa untuk mendapatkan proses pembelajaran yang efektif selama pembelajaran online.
2. Bagi Peneliti, mengaplikasikan Database Design dan untuk memenuhi kewajiban proyek akhir mata kuliah Database System.
3. Bagi Dosen, mempermudah akses dosen untuk memberikan materi dan tugas pada mahasiswa selama pembelajaran online.

## 1.5 Sistematika Penelitian

BAB 1 PENDAHULUAN

Pada BAB 1 akan berisi latar belakang, rumusan masalah, tujuan dan manfaat penelitian dari pembuatan laporan ini.

BAB 2 LANDASAN TEORI

Pada BAB 2 akan berisi materi dan teori yang digunakan sebagai landasan teori dalam pembuatan laporan ini.

BAB 3 ANALISIS

Pada BAB 3 akan berisi mengenai definisi sistem, identifikasi permasalahan dan kebutuhan pengguna.

BAB 4 DESIGN

Pada BAB 4 akan berisi mengenai model konseptual, logikal dan fisikal dari sistem database yang akan dibuat.

# BAB 2 LANDASAN TEORI

## 2.1 Database

Database sendiri adalah kumpulan informasi terstruktur yang disusun secara terorganisir. Informasi ini disimpan secara elektronik dalam sistem komputer dalam bentuk data. Penggunaan database sediri adalah agar data yang ada dapat dengan mudah diakses, dikelola, dimodifikasi, diperbaharui, dikontrol dan diorganisir sehingga dapat menjaga data-data [3]. Database sendiri memiliki bermacam-macam jenis antara lain Relational database, Object-oriented database, Distributed database dan lainnya. Jenis database yang paling sering digunakan adalah database relasional (Relational Database).

Mengakses, mengelola, memodifikasi, memperbaharui, mengontrol dan mengorganisir suatu database membutuhkan perangkat lunak yang biasanya disebut dengan Database Management System (DBMS). Fungsi lain yang dapat dilakukan oleh DBMS selain fungsi yang telah disebutkan sebelumnya adalah untuk menangani penyimpanan, backup, pelaporan, kontrol multi-akses, dan keamanan data dalam suatu database [3].Penggunaan DBMS sendiri mempermudah pengguna untuk menyimpan dan mengakses data dengan adanya antarmuka yang dapat menampilkan informasi yang ada secara terstruktur. Kebanyakan DBMS menggunakan Structured Query Language (SQL) untuk melakukan query atau perintah yang berkaitan dengan database. Beberapa DBMS yang sering digunakan adalah MySQL, Microsoft Access, Oracle, Microsoft SQL Server dan dBASE.

## 2.2 Learning Management System

Learning Management System (LMS) adalah perangkat lunak yang dapat digunakan untuk membantu proses pendidikan. LMS ini memiliki kegunaan untuk memberikan materi pendidikan, tugas, informasi pendidikan dan hal-hal lainnya yang menunjang dalam pendidikan jarak jauh (PJJ) maupun pendidikan tatap muka [4]. Penggunaan LMS sendiri dapat membantu siswa dan guru atau dosen untuk mengetahui kehadiran, waktu pertemuan atau tugas dan kemajuan belajar dari siswa. LMS juga dapat membantu orang tua siswa untuk mengetahui nilai dan perkembangan belajar siswa di institusi pendidikan [5]. Beberapa LMS yang sudah sering digunakan oleh institusi pendidikan adalah Blackboard Learn, D2L Brightspace, Instructure Canvas, Moodle dan Sakai.

# BAB 3 ANALISIS

## Diagram Description automatically generated3.1 System Definition

## Gambar 3.. Use Case Diagram

## 3.2 Identifikasi Permasalahan

Berdasarkan latar belakang yang telah ditulis, terdapat beberapa identifikasi masalah yaitu sebagai berikut:

1. Pandemi COVID-19 membuat proses pendidikan terhambat.
2. Pentingnya penggunaan Learning Management System untuk membantu proses pendidikan.
3. Pentingnya Learning Management System dengan database yang baik agar pendidikan dapat berjalan dengan lancar.

## 3.3 Identifikasi Kebutuhan Pengguna

Berdasarkan permasalahan yang telah dijabarkan, terdapat beberapa kebutuhan user yaitu sebagai berikut :

1. Dapat diakses oleh mahasiswa dan dosen.
2. Memberikan data mata kuliah dan kelas yang rinci bagi mahasiswa.
3. Memberikan *to do list* untuk mahasiswa agar dapat memantau tugas dan forum yang belum dikerjakan.
4. Memberikan *student activity log* untuk dosen agar dapat memantau kegiatan belajar dari mahasiswa.
5. Memperlihatkan daftar kehadiranuntuk masing-masing pertemuan dari mata kuliah yang ada.

# BAB 4 DESIGN

## 4.1 Conceptual Design

|  |  |  |  |
| --- | --- | --- | --- |
| **Entity Name** | **Description** | **Aliases** | **Occurence** |
| student | Berisi data diri mahasiswa | - |  |
| course | Berisi kode dan nama mata kuliah | - |  |
| lecturer | Berisi data diri dosen | - |  |
| class | Berisi kode dan kategori kelas | - |  |
| class\_detail | Berisi informasi kelas yang diikuti oleh mahasiswa | - |  |
| class\_schedule | Berisi jadwal kelas | - |  |
| attendance | Berisi daftar absensi untuk masing-masing jadwal kelas | - |  |
| forum\_thread | Berisi posting forum | - |  |
| forum\_thread\_reply | Berisi balasan untuk masing-masing posting forum | - |  |
| assignment\_question | Berisi soal-soal tugas | - |  |
| assignment\_answer | Berisi jawaban untuk masing-masing tugas | - |  |
| student\_todo | Berisi daftar tugas yang harus diselesaikan oleh mahasiswa | - |  |
| student\_activity\_log | Berisi catatan keaktifan mahasiswa dalam pengerjaan tugas atau forum | - |  |

### 4.1.1 Entity Types

Tabel 4.1 Entity Types

### 4.1.2 Relationship Types

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Entity Name** | **Multiplicity** | **Relationship** | **Multiplicity** | **Entity Name** |
| student | 0..1  0..1  0..1  0..1  0..1  0..1  0..1 | Berkaitan  Berkaitan  Berkaitan  Berkaitan  Berkaitan  Berkaitan  Berkaitan | 0..\*  0..\*  0..\*  0..\*  0..\*  0..\*  0..\* | class\_detail  attendance  forum\_thread  forum\_thread\_reply  assignment\_answer  student\_todo  student\_activity\_log |
| course | 0..1 | Berkaitan | 0..\* | class\_detail |
| lecturer | 0..1  0..1  0..1  0..1  0..1 | Berkaitan  Berkaitan  Berkaitan  Berkaitan  Berkaitan | 0..\*  0..\*  0..\*  0..\*  0..\* | class\_detail  attendance  forum\_thread  forum\_thread\_reply  assignment\_question |
| class | 0..1 | Berkaitan | 0..\* | class\_detail |
| class\_detail | 0..\*  0..\*  0..\*  0..\*  0..1  0..1  0..1  0..1 | Memiliki  Memiliki  Memiliki  Memiliki  Berkaitan  Berkaitan  Berkaitan  Berkaitan | 0..1  0..1  0..1  0..1  0..\*  0..\*  0..\*  0..\* | student  course  lecturer  class  class\_schedule  forum\_thread  assignment\_question  student\_activity\_log |
| class\_schedule | 0..\*  0..1 | Memiliki  Berkaitan | 0..1  0..\* | class\_detail  attendance |
| attendance | 0..\*  0..\*  0..\* | Memiliki  Memiliki  Memiliki | 0..1  0..1  0..1 | class\_schedule  student  lecturer |
| forum\_thread | 0..\*  0..\*  0..\*  0..1  0..1 | Memiliki  Memiliki  Memiliki  Berkaitan  Berkaitan | 0..1  0..1  0..1  0..\*  0..\* | class\_detail  student  lecturer  forum\_thread\_reply  student\_todo |
| forum\_thread\_reply | 0..\*  0..\*  0..\* | Memiliki  Memiliki  Memiliki | 0..1  0..1  0..1 | forum\_thread  student  lecturer |
| assignment\_question | 0..\*  0..\*  0..1  0..1 | Memiliki  Memiliki  Berkaitan  Berkaitan | 0..1  0..1  0..\*  0..\* | class\_detail  lecturer  assignment\_answer  student\_todo |
| assignment\_answer | 0..\*  0..\* | Memiliki  Memiliki | 0..1  0..1 | assignment\_answer  student |
| student\_todo | 0..\*  0..\*  0..\* | Memiliki  Memiliki  Memiliki | 0..1  0..1  0..1 | student  assignment\_question  forum\_thread |
| student\_activity\_log | 0..\*  0..\* | Memiliki  Memiliki | 0..1  0..1 | class\_detail  student |

Tabel 4.2 Relationship Types

### 4.1.3 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Entity Name** | **Attribute** | **Description** | **Data Type & Length** | **Nulls** | **Muti-Valued** |
| student | id  name  email  password\_hash  gender  phone\_number  sat\_point | identifikasi student  nama mahasiswa  email mahasiswa  hash password  jenis kelamin  nomor telepon  poin sat | char(10)  varchar(50)  varchar(50)  char(64)  varchar(50)  varchar(50)  integer | No  No  No  No  No  No  No | No  No  No  No  No  No  No |
| course | id  name | identifikasi course  nama nata kuliah | char(8)  varchar(50) | No  No | No  No |
| lecturer | id  name  email  password\_hash  gender  phone\_number | identifikasi lecturer  nama dosen  email dosen  hash password  jenis kelamin  nomor telepon | char(5)  varchar(50)  varchar(50)  char(64)  varchar(50)  varchar(50) | No  No  No  No  No  No | No  No  No  No  No  No |
| class | id  category | identifikasi class  kategori kelas | char(4)  varchar(50) | No  No | No  No |
| class\_detail | id  student\_id  course\_id  lecturer\_id  class\_id  term | identifikasi class\_detail  identifikasi student  identifikasi course  kode dosen  kode kelas  semester | integer  char(10)  char(8)  char(5)  char(4)  integer | No  No  No  No  No  No | No  No  No  No  No  No |
| class\_schedule | id  class\_detail\_id  date  time  duration  mode  location | identifikasi class\_schedule  identifikasi class\_detail  tanggal pengadaan kelas  jam dan menit pengadaan kelas  durasi kelas dalam menit  mode pengadaan kelas  lokasi pengadaan kelas | integer  integer  date  time  integer  varchar(50)  varchar(50) | No  No  No  No  No  No  No | No  No  No  No  No  No  No |
| attendance | id  class\_schedule\_id  student\_id  lecturer\_id | identifikasi attendance  identifikasi class\_schedule  identifikasi student  identifikasi lecturer | integer  integer  char(10)  char(5) | No  No  Yes  Yes | No  No  No  No |
| forum\_thread | id  class\_detail\_id  student\_id  lecturer\_id  title  content  date\_created  deadline | identifikasi forum\_thread  identifikasi class\_detail  identifikasi student  identifikasi lecturer  judul thread forum  isi/deskripsi thread forum  tanggal pembuatan  batas terakhir pengisian | integer  integer  char(10)  char(5)  varchar(50)  text  date  date | No  No  Yes  Yes  No  No  No  No | No  No  No  No  No  No  No  No |
| forum\_thread\_reply | id  forum\_thread\_id  student\_id  lecturer\_id  title  content  date\_created | identifikasi forum\_thread\_reply  identifikasi forum\_thread  identifikasi student  identifikasi lecturer  judul reply forum  isi reply forum  tanggal pembuatan | integer  integer  char(10)  char(5)  varchar(50)  text  date | No  No  Yes  Yes  No  No  No | No  No  No  No  No  No  No |
| assignment\_question | id  class\_detail\_id  lecturer\_id  title  question\_file\_path  date\_created  deadline | identifikasi assignment\_question  identifikasi class\_detail  identifikasi lecturer  judul assignment  path dari file soal  tanggal pembuatan  batas pengumpulan | integer  integer  char(5)  varchar(50)  varchar(250)  date  date | No  No  No  No  No  No  No | No  No  No  No  No  No  No |
| assignment\_answer | id  assignment\_question\_id  student\_id  title  answer\_file\_path  status | identifikasi assignment\_answer  identifikasi assignment\_question  identifikasi student  judul jawaban  path dari file jawaban  status pengerjaan | integer  integer  char(10)  varchar(50)  varchar(250)  varchar(50) | No  No  No  No  No  No | No  No  No  No  No  No |
| student\_todo | id  student\_id  assignment\_question\_id  forum\_thread\_id  task\_title  task\_type  status | identifikasi student\_todo  identifikasi student  identifikasi assignment\_question  identifikasi forum\_thread  judul tugas  tipe tugas  status pengerjaan | integer  char(10)  integer  integer  varchar(50)  varchar(50)  varchar(50) | No  No  Yes  Yes  No  No  No | No  No  No  No  No  No  No |
| student\_activity\_log | id  class\_detail\_id  student\_id  activity\_title  activity\_type  status | identifikasi student\_activity\_log  identifikasi class\_detail  identifikasi student  judul aktivitas  tipe aktivitas  status pengerjaan | integer  integer  char(10)  varchar(50)  varchar(50)  varchar(50) | No  No  No  No  No  No | No  No  No  No  No  No |

Tabel 4.3 Attributes

### 4.1.4 Attribute Domains

List of attribute domain:

1. Attribut domain pada tabel student yang memenuhi id adalah constraint bernama chk\_student\_id dimana nilai yang dianggap valid oleh constraint ini adalah angka dari 1000000000 hingga 9999999999.
2. Attribut domain pada tabel student yang memenuhi password\_hash adalah constraint bernama chk\_student\_password\_hash dimana nilai yang dianggap valid oleh constraint ini adalah yang memiliki panjang tepat 64 karakter.
3. Attribut domain pada tabel student yang memenuhi gender adalah constraint bernama chk\_student\_gender dimana nilai yang dianggap valid oleh constraint ini adalah kata Male atau Female.
4. Attribut domain pada tabel course yang memenuhi id adalah constraint bernama chk\_course\_id dimana nilai yang dianggap valid oleh constraint ini adalah kata dengan 4 karakter berupa huruf dan 4 karakter berupa angka dari 0 hingga 9.
5. Attribut domain pada tabel lecturer yang memenuhi id adalah constraint bernama chk\_lecturer\_id dimana nilai yang dianggap valid oleh constraint ini adalah kata yang diawali huruf D dan diakhiri dengan 4 digit angka 0 hingga 9.
6. Attribut domain pada tabel lecturer yang memenuhi password\_hash adalah constraint bernama chk\_lecturer\_password\_hash dimana nilai yang dianggap valid oleh constraint ini adalah yang memiliki panjang tepat 64 karakter.
7. Attribut domain pada tabel lecturer yang memenuhi gender adalah constraint bernama chk\_lecturer\_gender dimana nilai yang dianggap valid oleh constraint ini adalah kata Male atau Female.

### 4.1.5 Candidate Keys, Primary Keys and Alternate Keys

|  |  |  |  |
| --- | --- | --- | --- |
| **Entity Name** | **Candidate Key** | **Primary Key** | **Alternate Key** |
| student | id  email | id | email |
| course | id | id | x |
| lecturer | id  email | id | email |
| class | id | id | x |
| class\_detail | id | id | x |
| class\_schedule | id  {class\_detail\_id, date, time} | id | {class\_detail\_id, date, time} |
| attendance | id  {class\_schedule\_id, student\_id}  {class\_schedule\_id, lecturer\_id} | id | {class\_schedule\_id, student\_id}  {class\_schedule\_id, lecturer\_id} |
| forum\_thread | id | id | x |
| forum\_thread\_reply | id | id | x |
| assignment\_question | id  question\_file\_path | id | question\_file\_path |
| assignment\_answer | id  answer\_file\_path | id | answer\_file\_path |
| student\_todo | id  {student\_id, assignment\_question\_id}  {student\_id, forum\_thread\_id} | id | {student\_id, assignment\_question\_id}  {student\_id, forum\_thread\_id} |
| student\_activity\_log | id | id | x |

**Tabel 4.4 Candidate Keys, Primary Keys and Alternate Keys**

### 4.1.6 Redundant Relationship

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Entity Name** | **Index Name** | **Index** | **Type** | |
| **Clustered** | **Non Clustered** |
| student | PRIMARY | id | **✓** |  |
| course | PRIMARY | id | **✓** |  |
| lecturer | PRIMARY | id | **✓** |  |
| class | PRIMARY | id | **✓** |  |
| class\_detail | PRIMARY | id | **✓** |  |
| class\_schedule | PRIMARY | id | **✓** |  |
| attendance | PRIMARY | id | **✓** |  |
| forum\_thread | PRIMARY | id | **✓** |  |
| forum\_thread\_reply | PRIMARY | id | **✓** |  |
| assignment\_question | PRIMARY | id | **✓** |  |
| assignment\_answer | PRIMARY | id | **✓** |  |
| student\_todo | PRIMARY | id | **✓** |  |
| student\_activity\_log | PRIMARY | id | **✓** |  |

**Tabel 4.5 Redundant Relationship**

### Diagram Description automatically generated4.1.7 Entity Relationship Diagram

Gambar 4.. Entity Relationship Diagram

## 4.2 Logical Model (Class Diagram)

Diagram, schematic

Description automatically generated

Gambar 4.2 Logical Model (Class Diagram)

## 4.3 Physical Model

### 4.3.1 List of Index

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Entity Name** | **Index Name** | **Index** | **Type** | |
| **Clustered** | **Non Clustered** |
| student | PRIMARY | id | **✓** |  |
| course | PRIMARY | id | **✓** |  |
| lecturer | PRIMARY | id | **✓** |  |
| class | PRIMARY | id | **✓** |  |
| class\_detail | PRIMARY | id | **✓** |  |
| class\_schedule | PRIMARY | id | **✓** |  |
| attendance | PRIMARY | id | **✓** |  |
| forum\_thread | PRIMARY | id | **✓** |  |
| forum\_thread\_reply | PRIMARY | id | **✓** |  |
| assignment\_question | PRIMARY | id | **✓** |  |
| assignment\_answer | PRIMARY | id | **✓** |  |
| student\_todo | PRIMARY | id | **✓** |  |
| student\_activity\_log | PRIMARY | id | **✓** |  |

**Tabel 4.6 List of Index**

### 4.3.2 Analyze Transaction

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Transaction / Relation** | **Student** | | | | **Lecturer** | | | | **Administrator** | | | |
| **Read** | **Update** | **Delete** | **Insert** | **Read** | **Update** | **Delete** | **Insert** | **Read** | **Update** | **Delete** | **Insert** |
| student | x | x |  |  |  |  |  |  | x | x | x | x |
| course | x |  |  |  | x |  |  |  | x | x | x | x |
| lecturer |  |  |  |  | x | x |  |  | x | x | x | x |
| class |  |  |  |  |  |  |  |  | x | x | x | x |
| class\_detail | x |  |  |  | x |  |  |  | x | x | x | x |
| class\_schedule | x |  |  |  | x |  |  |  | x | x | x | x |
| attendance | x |  |  |  | x |  |  |  | x | x | x | x |
| forum\_thread | x | x | x | x | x | x | x | x | x | x | x | x |
| forum\_thread\_reply | x | x | x | x | x | x | x | x | x | x | x | x |
| assignment\_question | x |  |  |  | x | x | x | x | x | x | x | x |
| assignment\_answer | x | x | x | x | x |  |  |  | x | x | x | x |
| student\_todo | x |  |  |  |  |  |  |  | x | x | x | x |
| student\_activity\_log |  |  |  |  | x |  |  |  | x | x | x | x |

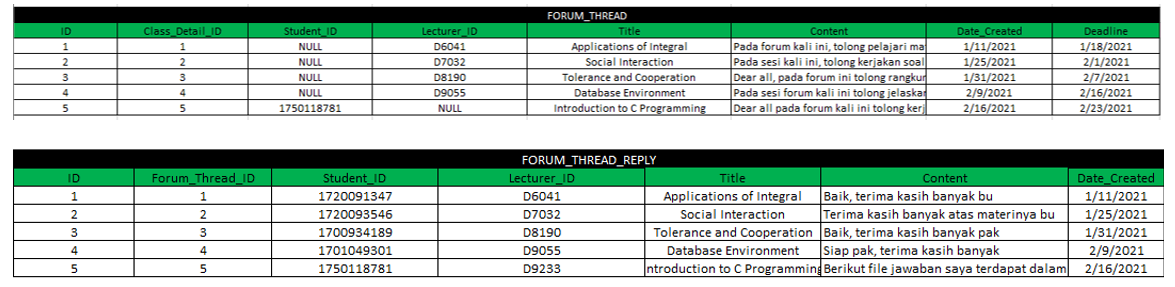
**Tabel 4.7 Analyze Transaction**

### 4.3.3 User View, Procedure and Function

Table

Description automatically generated

Gambar 4.3.1 User View, Procedure and Function



Gambar 4.3.2 User View, Procedure and Function

**VIEWS**

USE elearning;

CREATE VIEW class\_people

AS

SELECT

class\_detail.term AS 'Term',

class.category AS 'Class',

course.name AS 'Course',

lecturer.name AS 'Lecturer',

student.name AS 'Student'

FROM class\_detail

INNER JOIN student ON class\_detail.student\_id = student.id

INNER JOIN course ON class\_detail.course\_id = course.id

INNER JOIN lecturer ON class\_detail.lecturer\_id = lecturer.id

INNER JOIN class ON class\_detail.class\_id = class.id

GROUP BY class\_detail.term, class.category, course.name, lecturer.name;

SELECT \* FROM class\_people;

Graphical user interface, text, application

Description automatically generated

**Gambar 4.3.3 View 1**

CREATE VIEW all\_course

AS

SELECT

class\_detail.term AS 'Term',

class.category AS 'Class',

course.name AS 'Course',

forum\_thread.title AS 'Forum Thread',

assignment\_question.title AS 'Assignment Question'

FROM course

INNER JOIN class\_detail ON course.id = class\_detail.course\_id

INNER JOIN class ON class\_detail.class\_id = class.id

INNER JOIN forum\_thread ON forum\_thread.class\_detail\_id = class\_detail.id

INNER JOIN assignment\_question ON assignment\_question.class\_detail\_id = class\_detail.id

GROUP BY class\_detail.term, class.category, course.name, forum\_thread.title;

SELECT \* FROM all\_course;

Graphical user interface, text, application, email

Description automatically generated

**Gambar 4.3.4 View 2**

CREATE VIEW all\_forum

AS

SELECT

class\_detail.term AS 'Term',

class.category AS 'Class',

forum\_thread.title AS 'Forum Thread Title',

forum\_thread.content AS 'Forum Thread Content',

forum\_thread\_reply.title AS 'Forum Thread Reply Title',

forum\_thread\_reply.content AS 'Forum Thread Reply Content'

FROM forum\_thread

INNER JOIN class\_detail ON forum\_thread.class\_detail\_id = class\_detail.id

INNER JOIN class ON class\_detail.class\_id = class.id

INNER JOIN forum\_thread\_reply ON forum\_thread.id = forum\_thread\_reply.forum\_thread\_id

GROUP BY class\_detail.term, class.category, forum\_thread.title, forum\_thread\_reply.title;

SELECT \* FROM all\_forum;

**Gambar 4.3.5 View Text

Description automatically generated3**

**PROCEDURES**

USE elearning;

DELIMITER //

CREATE PROCEDURE get\_assignment (

IN id char(10)

)

BEGIN

SELECT

assignment\_question.id AS 'ID',

assignment\_question.title AS 'Assignment Title',

assignment\_question.question\_file\_path AS 'Assignment File Path'

FROM assignment\_question

INNER JOIN class\_detail ON assignment\_question.class\_detail\_id = class\_detail.id

WHERE id = class\_detail.student\_id;

END //

DELIMITER ;

CALL get\_assignment ('1720093546');

Graphical user interface, text, application

Description automatically generated

**Gambar 4.3.6 Procedure 1**

DELIMITER //

CREATE PROCEDURE get\_forum (

IN id char(10))

BEGIN

SELECT

forum\_thread.id AS 'ID',

forum\_thread.title AS 'Forum Title',

forum\_thread.content AS 'Forum Content'

FROM forum\_thread

INNER JOIN class\_detail ON forum\_thread.class\_detail\_id = class\_detail.id

WHERE id = class\_detail.student\_id;

END //

DELIMITER ;

CALL get\_forum ('1720093546');

**Gambar 4.3.7 Procedure Graphical user interface, text, application

Description automatically generated2**

DELIMITER //

CREATE PROCEDURE get\_todo (

IN id char(10))

BEGIN

SELECT \*

FROM student\_todo

WHERE id = student\_todo.student\_id;

END //

DELIMITER ;

**Graphical user interface, text, application

Description automatically generated**CALL get\_todo ('1720093546');

**Gambar 4.3.8 Procedure 3**

**Functions (Triggers)**

USE elearning;

DELIMITER //

CREATE TRIGGER after\_assignment\_question\_update

AFTER UPDATE

ON assignment\_question FOR EACH ROW

BEGIN

DECLARE title varchar(50);

DECLARE id integer;

SET title = NEW.title;

SET id = OLD.id;

UPDATE student\_todo

SET task\_title = title

WHERE assignment\_question\_id = id;

END//

DELIMITER ;

UPDATE assignment\_question

SET title = 'Recursive Function'

WHERE id = 5;

Graphical user interface, text, application

Description automatically generatedSELECT \* FROM student\_todo WHERE id = 5;

**Gambar 4.3.9 Trigger 1**

DELIMITER //

CREATE TRIGGER after\_forum\_thread\_update

AFTER UPDATE

ON forum\_thread FOR EACH ROW

BEGIN

DECLARE title varchar(50);

DECLARE id integer;

SET title = NEW.title;

SET id = OLD.id;

UPDATE student\_todo

SET task\_title = title

WHERE forum\_thread\_id = id;

END//

DELIMITER ;

UPDATE forum\_thread

SET title = 'Database Security'

WHERE id = 4;

Graphical user interface, text, application

Description automatically generatedSELECT \* FROM student\_todo WHERE id = 4;

**Gambar 4.3.10 Trigger 2**

DELIMITER //

CREATE TRIGGER after\_assignment\_answer\_insert

AFTER INSERT

ON assignment\_answer FOR EACH ROW

BEGIN

DECLARE title varchar(50);

DECLARE id char(10);

SET id = NEW.assignment\_question\_id;

SET student\_id = OLD.student\_id;

UPDATE student\_todo

SET status = 'Done'

WHERE student\_id = student\_id AND assignment\_question\_id = id;

END//

DELIMITER ;

INSERT INTO `assignment\_answer` VALUES

('6', '1', '1720091347', 'Integral\_rev', 'assignment/answer/1-integral\_rev', 'Pending');

**Graphical user interface, text, application

Description automatically generated**SELECT \* FROM student\_todo WHERE id = 1;

**Gambar 4.3.11 Trigger 3**

# DAFTAR PUSTAKA

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[2] Kemendikbud, “Kementerian Pendidikan dan Kebudayaan » Republik Indonesia,” 2020. https://www.kemdikbud.go.id/main/blog/2020/05/kemendikbud-terbitkan-pedoman-penyelenggaraan-belajar-dari-rumah (accessed Des. 27, 2020).

[3] Oracle, “What Is a Database | Oracle.” https://www.oracle.com/database/what-is-database/ (accessed Jan. 2, 2021).

[4] C. E. K. Chih-Hung Chung, Laura A. Pasquini, “Web-based Learning Management System Considerations for Higher Education Chih-Hung Chung, University of North Texas Laura A. Pasquini, University of North Texas Chang E. Koh, University of North Texas,” Learn. Perform. Q., vol. 1, no. 4, pp. 24–37, 2013.

[5] [1] F. Mahnegar, “Learning Management Systems,” Learn. Manag. Syst., 2012, doi: 10.4018/978-1-60566-198-8.ch194.

# LAMPIRAN

1. **Create Database & Create Table**

CREATE DATABASE elearning;

USE elearning;

CREATE TABLE `student` (

`id` char(10) PRIMARY KEY,

`name` varchar(50) NOT NULL,

`email` varchar(50) NOT NULL,

`password\_hash` char(64) NOT NULL,

`gender` varchar(50) NOT NULL,

`phone\_number` varchar(50) NOT NULL,

`sat\_point` integer NOT NULL,

CONSTRAINT `chk\_student\_id` CHECK (`id` RLIKE '[1000000000-9999999999]'),

CONSTRAINT `chk\_student\_password\_hash` CHECK (LENGTH(`password\_hash`) = 64),

CONSTRAINT `chk\_student\_gender` CHECK (`gender` = 'Male' OR `gender` = 'Female')

);

CREATE TABLE `course` (

`id` char(8) PRIMARY KEY,

`name` varchar(50) NOT NULL,

CONSTRAINT `chk\_course\_id` CHECK (`id` RLIKE '[A-Z][A-Z][A-Z][A-Z][0-9][0-9][0-9][0-9]')

);

CREATE TABLE `lecturer` (

`id` char(5) PRIMARY KEY,

`name` varchar(50) NOT NULL,

`email` varchar(50) NOT NULL,

`password\_hash` char(64) NOT NULL,

`gender` varchar(50) NOT NULL,

`phone\_number` varchar(50) NOT NULL,

CONSTRAINT `chk\_lecturer\_id` CHECK (`id` RLIKE 'D[0-9][0-9][0-9][0-9]'),

CONSTRAINT `chk\_lecturer\_password\_hash` CHECK (LENGTH(`password\_hash`) = 64),

CONSTRAINT `chk\_lecturer\_gender` CHECK (`gender` = 'Male' OR `gender` = 'Female' )

);

CREATE TABLE `class` (

`id` char(4) PRIMARY KEY,

`category` varchar(50) NOT NULL

);

CREATE TABLE `class\_detail` (

`id` integer AUTO\_INCREMENT PRIMARY KEY,

`student\_id` char(10) NOT NULL,

`course\_id` char(8) NOT NULL,

`lecturer\_id` char(5) NOT NULL,

`class\_id` char(4) NOT NULL,

`term` integer,

FOREIGN KEY (`student\_id`) REFERENCES `student` (`id`) ON UPDATE CASCADE ON DELETE CASCADE,

FOREIGN KEY (`lecturer\_id`) REFERENCES `lecturer` (`id`) ON UPDATE CASCADE ON DELETE CASCADE,

FOREIGN KEY (`course\_id`) REFERENCES `course` (`id`) ON UPDATE CASCADE ON DELETE CASCADE,

FOREIGN KEY (`class\_id`) REFERENCES `class` (`id`) ON UPDATE CASCADE ON DELETE CASCADE

);

CREATE TABLE `class\_schedule` (

`id` integer AUTO\_INCREMENT PRIMARY KEY,

`class\_detail\_id` integer NOT NULL,

`date` date NOT NULL,

`time` time NOT NULL,

`duration` int NOT NULL,

`mode` varchar(50) NOT NULL,

`location` varchar(50) NOT NULL,

FOREIGN KEY (`class\_detail\_id`) REFERENCES `class\_detail` (`id`) ON UPDATE CASCADE ON DELETE CASCADE

);

CREATE TABLE `attendance` (

`id` integer AUTO\_INCREMENT PRIMARY KEY,

`class\_schedule\_id` integer NOT NULL,

`student\_id` char(10) NULL,

`lecturer\_id` char(5) NULL,

FOREIGN KEY (`class\_schedule\_id`) REFERENCES `class\_schedule` (`id`) ON UPDATE CASCADE ON DELETE CASCADE,

FOREIGN KEY (`student\_id`) REFERENCES `student` (`id`) ON UPDATE CASCADE ON DELETE CASCADE,

FOREIGN KEY (`lecturer\_id`) REFERENCES `lecturer` (`id`) ON UPDATE CASCADE ON DELETE CASCADE

);

CREATE TABLE `forum\_thread` (

`id` integer AUTO\_INCREMENT PRIMARY KEY,

`class\_detail\_id` integer NOT NULL,

`student\_id` char(10) NULL,

`lecturer\_id` char(5) NULL,

`title` varchar(50) NOT NULL,

`content` text NOT NULL,

`date\_created` date NOT NULL,

`deadline` date,

FOREIGN KEY (`class\_detail\_id`) REFERENCES `class\_detail` (`id`) ON UPDATE CASCADE ON DELETE CASCADE,

FOREIGN KEY (`student\_id`) REFERENCES `student` (`id`) ON UPDATE CASCADE ON DELETE CASCADE,

FOREIGN KEY (`lecturer\_id`) REFERENCES `lecturer` (`id`) ON UPDATE CASCADE ON DELETE CASCADE

);

CREATE TABLE `forum\_thread\_reply` (

`id` integer AUTO\_INCREMENT PRIMARY KEY,

`forum\_thread\_id` integer NOT NULL,

`student\_id` char(10) NULL,

`lecturer\_id` char(5) NULL,

`title` varchar(50) NOT NULL,

`content` text NOT NULL,

`date\_created` date NOT NULL,

FOREIGN KEY (`forum\_thread\_id`) REFERENCES `forum\_thread` (`id`) ON UPDATE CASCADE ON DELETE CASCADE,

FOREIGN KEY (`student\_id`) REFERENCES `student` (`id`) ON UPDATE CASCADE ON DELETE CASCADE,

FOREIGN KEY (`lecturer\_id`) REFERENCES `lecturer` (`id`) ON UPDATE CASCADE ON DELETE CASCADE

);

CREATE TABLE `assignment\_question` (

`id` integer AUTO\_INCREMENT PRIMARY KEY,

`class\_detail\_id` integer NOT NULL,

`lecturer\_id` char(5) NOT NULL,

`title` varchar(50) NOT NULL,

`question\_file\_path` varchar(250) NOT NULL,

`date\_created` date NOT NULL,

`deadline` date NOT NULL,

FOREIGN KEY (`class\_detail\_id`) REFERENCES `class\_detail` (`id`) ON UPDATE CASCADE ON DELETE CASCADE,

FOREIGN KEY (`lecturer\_id`) REFERENCES `lecturer` (`id`) ON UPDATE CASCADE ON DELETE CASCADE

);

CREATE TABLE `assignment\_answer` (

`id` integer AUTO\_INCREMENT PRIMARY KEY,

`assignment\_question\_id` integer NOT NULL,

`student\_id` char(10) NOT NULL,

`title` varchar(50) NOT NULL,

`answer\_file\_path` varchar(250) NOT NULL,

`status` varchar(50) NOT NULL,

FOREIGN KEY (`assignment\_question\_id`) REFERENCES `assignment\_question` (`id`) ON UPDATE CASCADE ON DELETE CASCADE,

FOREIGN KEY (`student\_id`) REFERENCES `student` (`id`) ON UPDATE CASCADE ON DELETE CASCADE

);

CREATE TABLE `student\_todo` (

`id` integer AUTO\_INCREMENT PRIMARY KEY,

`student\_id` char(10) NOT NULL,

`assignment\_question\_id` integer NULL,

`forum\_thread\_id` integer NULL,

`task\_title` varchar(50) NOT NULL,

`task\_type` varchar(50) NOT NULL,

`status` varchar(50) NOT NULL,

FOREIGN KEY (`student\_id`) REFERENCES `student` (`id`),

FOREIGN KEY (`assignment\_question\_id`) REFERENCES `assignment\_question` (`id`) ON UPDATE CASCADE ON DELETE CASCADE,

FOREIGN KEY (`forum\_thread\_id`) REFERENCES `forum\_thread` (`id`) ON UPDATE CASCADE ON DELETE CASCADE

);

CREATE TABLE `student\_activity\_log` (

`id` integer AUTO\_INCREMENT PRIMARY KEY,

`class\_detail\_id` integer NOT NULL,

`student\_id` char(10) NOT NULL,

`activity\_title` varchar(50) NOT NULL,

`activity\_type` varchar(50) NOT NULL,

`status` varchar(50) NOT NULL,

FOREIGN KEY (`class\_detail\_id`) REFERENCES `class\_detail` (`id`) ON UPDATE CASCADE ON DELETE CASCADE,

FOREIGN KEY (`student\_id`) REFERENCES `student` (`id`) ON UPDATE CASCADE ON DELETE CASCADE

);

1. **Inserts**

USE elearning;

INSERT INTO `student` VALUES

('1720091347', 'Georgius Yordan', 'georgius.yordan@gmail.com', SHA2('geor333yor', 256), 'Male', '082236520156', '98'),

('1720093546', 'Lisa Amelia', 'lisa.amelia@gmail.com', SHA2('lisa9898', 256), 'Female', '082200109304', '110'),

('1700934189', 'Banu Setadjo', 'banu.setadjo@gmail.com', SHA2('banuSeta15', 256), 'Male', '082199032239', '67'),

('1701049301', 'Michael Watson', 'michael.watson@gmail.com', SHA2('micson69', 256), 'Male', '080239182367', '81'),

('1750118781', 'Daniel Pratama', 'daniel.pratama@gmail.com', SHA2('danprama27', 256), 'Male', '081230092741', '170');

INSERT INTO `course` VALUES

('MATH6120', 'Calculus'),

('COMP6369', 'Human Computer Interaction'),

('CHAR6030', 'Character Building - Pancasila'),

('ISYS6028', 'Database System'),

('COMP6363', 'Algorithm and Programming');

INSERT INTO `lecturer` VALUES

('D6041', 'Nino Tsubaki', 'nino.tsubaki@gmail.com', SHA2('n1n0TSUBAKI', 256), 'Female', '082234511356'),

('D7032', 'Kizuna Wiryana', 'kizuna.wiryana@gmail.com', SHA2('steai3960', 256), 'Female', '082332192783'),

('D8190', 'Vano Setya', 'vano.setya@gmail.com', SHA2('van001setya', 256), 'Male', '082736271912'),

('D9055', 'Ethan Matson', 'ethan.matson@gmail.com', SHA2('et101son', 256), 'Male', '082731182183'),

('D9233', 'Melissa April', 'melissa.april@gmail.com', SHA2('melissApr1l', 256), 'Female', '082235406473');

INSERT INTO `class` VALUES

('CL01', 'Lecture'),

('CL02', 'Combined Lecture'),

('CL03', 'Laboratory'),

('CL04', 'Combined Laboratory'),

('CL05', 'Accelerated');

INSERT INTO `class\_detail` VALUES

('1', '1720091347', 'MATH6120', 'D6041', 'CL01', '2'),

('2', '1720093546', 'COMP6369', 'D7032', 'CL02', '2'),

('3', '1700934189', 'CHAR6030', 'D8190', 'CL03', '3'),

('4', '1701049301', 'ISYS6028', 'D9055', 'CL04', '5'),

('5', '1750118781', 'COMP6363', 'D9233', 'CL05', '5');

INSERT INTO `class\_schedule` VALUES

('1', '1', '2021-01-10', '09:00', '120', 'Vidcon', 'Zoom' ),

('2', '2', '2021-01-16', '10:00', '120', 'Vidcon', 'Zoom' ),

('3', '3', '2021-02-09', '14:00', '90', 'GSLC', 'Forum'),

('4', '4', '2021-02-11', '11:00', '90', 'GSLC', 'Forum'),

('5', '5', '2021-02-23', '10:00', '120', 'Vidcon', 'Zoom' );

INSERT INTO `attendance` VALUES

('1', '1', '1720091347', NULL),

('2', '2', NULL, 'D7032'),

('3', '3', NULL, 'D8190'),

('4', '4', '1701049301', NULL),

('5', '5', NULL, 'D9233');

INSERT INTO `forum\_thread` VALUES

('1', '1', NULL, 'D6041', 'Applications of Integral', 'Pada forum kali ini, tolong pelajari materi mengenai integral dari ppt yang diberikan. Terima kasih', '2021-01-11', '2021-01-18'),

('2', '2', NULL, 'D7032', 'Social Interaction', 'Pada sesi kali ini, tolong kerjakan soal dalam ppt slide 10 - 12.', '2021-01-25', '2021-02-01'),

('3', '3', NULL, 'D8190', 'Tolerance and Cooperation', 'Dear all, pada forum ini tolong rangkum materi pada hal 67 - 78 dari buku CB. Terima kasih', '2021-01-31', '2021-02-07'),

('4', '4', NULL, 'D9055', 'Database Environment', 'Pada sesi forum kali ini tolong jelaskan mengenai database systems, terminology, environment, and new concept of database. Dikumpulkan dalam bentuk word.', '2021-02-09', '2021-02-16'),

('5', '5', '1750118781', NULL, 'Introduction to C Programming', 'Dear all pada forum kali ini tolong kerjakan excersice berikut di word : State whether each of the following statements is TRUE or FALSE. If it is FALSE, explain why. 1. Every C program begins execution at main function 2. Comments cause the computer to print the text enclosed between /\* and \*/ on the screen when the program is executed

3. All variables must be defined before used 4. All variables must be given a type when they’re defined 5. C considers number and Number to be identical', '2021-02-16', '2021-02-23');

INSERT INTO `forum\_thread\_reply` VALUES

('1', '1', NULL, 'D6041', 'Applications of Integral', 'Baik, terima kasih banyak bu', '2021-01-11'),

('2', '2', '1720093546', NULL, 'Social Interaction', 'Terima kasih banyak atas materinya bu', '2021-01-25'),

('3', '3', '1700934189', NULL, 'Tolerance and Cooperation', 'Baik, terima kasih banyak pak', '2021-01-31'),

('4', '4', '1701049301', NULL, 'Database Environment', 'Siap pak, terima kasih banyak', '2021-02-09'),

('5', '5', '1750118781', NULL, 'Introduction to C Programming', 'Berikut file jawaban saya terdapat dalam file yang terlampir', '2021-02-16');

INSERT INTO `assignment\_question` VALUES

('1', '1', 'D6041', 'Applications of Integral', 'assignment/question/1-applications-of-integral', '2021-01-07', '2021-01-14'),

('2', '2', 'D7032', 'Social Interaction', 'assignment/question/2-social-interaction', '2021-01-09', '2021-01-16'),

('3', '3', 'D8190', 'Tolerance and Cooperation', 'assignment/question/3-tolerance-and-cooperation', '2021-01-14', '2021-01-21'),

('4', '4', 'D9055', 'Database Environment', 'assignment/question/4-database-environment', '2021-01-29', '2021-02-05'),

('5', '5', 'D9233', 'Introduction to C Programming', 'assignment/question/5-introduction-to-c-programming', '2021-02-03', '2021-02-10');

INSERT INTO `assignment\_answer` VALUES

('1', '1', '1720091347', 'Integral\_Georgius', 'assignment/answer/1-applications-of-integral', 'Pending'),

('2', '2', '1720093546', 'SocialInteraction\_LisaAmelia', 'assignment/answer/2-social-interaction', 'Graded'),

('3', '3', '1700934189', 'BanuSetadjo\_Pancasila', 'assignment/answer/3-tolerance-and-cooperation', 'Graded'),

('4', '4', '1701049301', 'Michael\_DatabaseEnvironment', 'assignment/answer/4-database-environment', 'Pending'),

('5', '5', '1750118781', 'DanielPratama-Programming', 'assignment/answer/5-introduction-to-c-programming', 'Graded');

INSERT INTO `student\_todo` VALUES

('1', '1720091347', '1', NULL, 'Applications of Integral', 'Assignment', 'Ongoing'),

('2', '1720093546', '2', NULL, 'Social Interaction', 'Assignment', 'Ongoing'),

('3', '1700934189', NULL, '3', 'Tolerance and Cooperation Among the Religious', 'Forum', 'Done'),

('4', '1701049301', NULL, '4', 'Database Environment', 'Forum', 'Late'),

('5', '1750118781', '5', NULL, 'Introduction to C Programming', 'Assignment', 'Done');

INSERT INTO `student\_activity\_log` VALUES

('1', '1', '1720091347', 'Applications of Integral', 'Assignment', 'Ongoing'),

('2', '2', '1720093546', 'Social Interaction', 'Assignment', 'Ongoing'),

('3', '3', '1700934189', 'Tolerance and Cooperation Among the Religious', 'Forum', 'Done'),

('4', '4', '1701049301', 'Database Environment', 'Forum', 'Late'),

('5', '5', '1750118781', 'Introduction to C Programming', 'Assignment', 'Done');

# LEMBAR PENILAIAN

**PERANCANGAN DATABASE UNTUK LEARNING MANAGEMENT SYSTEM**

MATA KULIAH ISYS6028 – DATABASE SYSTEMS

KELAS BA20 - LAB

Semester Ganjil 2020 / 2021

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DAFTAR MAHASISWA** |  | **NILAI** | |  | **BOBOT** | | | **KREDIT** | | | **TOTAL KREDIT** |
| **1** | **2** | **3** | **1** | **2** | **3** | 1 | 2 | 3 |
| 2301927872 – CHRISTIANO E. SANGALANG |  |  |  |  | 40% | 40% | 20% |  |  |  |  |
| 2301942242 – NATAN WAHYUDIANTO |  |  |  |  | 40% | 40% | 20% |  |  |  |  |
| 2301881852 – STEFANO CHRISTIAN WIRYANA |  |  |  |  | 40% | 40% | 20% |  |  |  |  |
|  | **TOTAL** | | |  |  | | |  | | |  |

**KETERANGAN :**

* **Skala Penilaian : 0 sd 100**
* **Komponen** 
  1. : Laporan
  2. : Produk
  3. : Presentasi

**Malang, …… - ……………. ……..**  **Malang, …… - ……………. ……..**

**(FRIHANDIKA PERMANA)**  **(WINA PERMANA SARI)**

**D6371**  **D5975**