



# ENSF 607 – Principles of Software Development

## Fall 2023



### Lab Assignment #3:

Due Dates	
Post-Lab	Submit before <u>23:59 on Friday, October 20, 2023,</u>

**This is a group assignment.** Students do have a choice of working on their own or working in groups of 3 or 4. If you are working with a partner, please submit one copy with both names included in the submission.

#### The following rules apply to this lab and all other lab assignments in the future:

1. Before submitting your lab reports, take a moment to make sure that you are handing in all the material that is required. If you forget to hand something in, that is your fault; you can't use 'I forgot' as an excuse to hand in parts of the assignment late.
2. **20% marks** will be deducted from the assignments handed in up to **24 hours** after each due date. It means if your mark is X out of Y, you will only gain 0.8 times X. There will be no credit for assignments turned in later than 24 hours after the due dates; they will be returned unmarked.



## Exercise 1

### Using the model for the Student Registration System

#### Total Mark 100 points

In this lab, you are asked to implement a student registration scenario, draw an ER diagram of how your database will look like, install a database (PostgreSQL, or MySQL), set up and populate the tables from the drawn diagram in the respective database using either SQL or the Admin GUI, get the JDBC driver from the vendor and use it in java code. In this assignment, you will need to create a database with three tables: Student, Course, and Registration.

Table name	Student	Course	Registration
Table parameters	1. Student Id varchar(10) 2. FirstName varchar(50) 3. LastName varchar(50) 4. Location varchar(100)	1. Course Id varchar(10) 2. Course Name varchar(50) 3. Course Title varchar(50)	1. Registration Id varchar(10) 2. Course Id varchar(10) 3. Student Id varchar(10)

You should implement all tables with primary keys and foreign keys.

You should demonstrate three queries:

- Get all students.
- Get all courses.
- Get all registrations.

**Task 1: Draw ER diagram (10 Marks)**

**Task 2: Installing the database with JDBC driver (20 Marks)**

**Task 3: Populating the database (10 Marks)**

**Task 4: Correct connection string (10 Marks)**

**Task 5: Demonstrating the three queries via java code (30 Marks)**

**Task 6: Documentation (20 Marks)**

- ER Diagram
- Screen print of the database and JDBC install.
- Commented Source code.
- Output of the three queries



## Exercise 2

### Building an Incident Management Dashboard

Total Mark 100 Points

In the following assignment you will build a dashboard that provides information on service tickets. Since we do not have a file with service tickets we need to create a database with service tickets.

#### 1. Setup a database for service tickets. (20 Points)

The service ticket database will have several tables.

**Table: EventActivity**

Column	Definition	Comment
ID	Integer	Primary key of activity. Should auto increment
Activityname	Varchar(20)	Activity name

Possible entries could be:

Design  
Construction  
Test  
Password Reset

**Table: EventOrigin**

Column	Definition	Comment
ID	Integer	Primary key of activity. Should auto increment
Activityname	Varchar(20)	Activity name

Possible entries could be:

Joe S.  
Bill B.  
George E.  
Achmed M.  
Rona E.

**Table: EventStatus**

Column	Definition	Comment
ID	Integer	Primary key of activity. Should auto increment
Status	Varchar(20)	Status Decsption

Possible entries:

Open



On Hold  
In Process  
Deployed  
Deployed Failed

**Table: EventClass**

Column	Definition	Comment
ID	Integer	Primary key of activity. Should auto increment
Class	Varchar(20)	Class Decsption

**Possible entries:**

Change  
Incident  
Problem  
SR for Service Request

**Table: EventLog**

Column	Definition	Comment
ID	Integer	Primary key of activity. Should auto increment
Caseid	Varchar(20)	Unique Case Id. Prefixed with CS_<number>
Activity	Varchar(20)	Activity from EventActivity Table
Urgency	Varchar(1)	Urgency value from table
Impact	Varchar(1)	Impact from table
Priority	Varchar(1)	Calculated priority from urgency and impact
StartDate	date	Date Ticket was created
EndDate	date	Ticked was closed
TicketStatus	Varchar(20)	Ticket status
UpdateDateTime	datetime	Date/Timestamp of ticket record
Duration	integer	Length of ticket time. Calculated between start date and end date
Origin	Varchar(20)	Person /Owner of ticket
Class	Varchar(20)	Ticket class from the class table

**2. Develop a ticket generator program (40 Points)**

Since we do not have any sample ticket file you need to write a program to generate tickets. You can either write the program in Java or Python. It should follow the following requirements. All values in the ticket will be randomly determined based on the respective values in the database table. That is as close as we can come to provide a good sample event log.

**Input parameters.**

Number of tickets to generate



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Time window for tickets.

Time window start date

Time window end date.

Each ticket that the program creates should fall within the provided time window. For example if you create 10000 tickets for the first 6 month of the year your time window is 2023-01-01 to 2023-06-30

### 3. Develop a dashboards and visualize the ticket data (40 Points)

You can try using any dashboard software of your choice. Most vendors provide a 30 day Trial. PowerBi is the most common one in the industry.

#### PowerBI

You can download it from here

<https://powerbi.microsoft.com/en-ca/downloads/>

#### Tableau

<https://www.tableau.com>

#### Spotfire

<https://www.tibco.com/products/tibco-spotfire>

Install the dashboard software of choice.

Connect to your incident database with the generated data.

Now create a couple of dashboards.

1. Show total number of tickets over time window as graph by class.
2. Show successful deployment over deployment failures as line chart by month
3. Show MTTR over time window.  $MTTR = \text{Duration} / \text{Number of Tickets}$
4. Try a couple of other interesting dashboards you might come up with. Play around with the generated data.

### Artifacts you need to provide for this assignment

1. The SQL scripts for your tables.
2. Your source code for the generator program
3. Your dashboards visualization in a PowerPoint with explanation



## Urgency, Impact and Priority

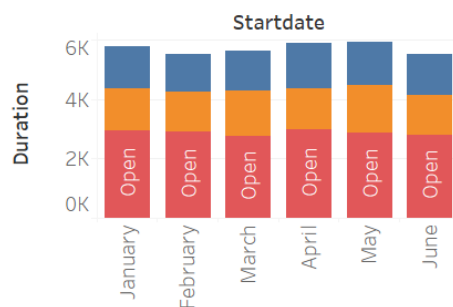
Priority is calculated from urgency and impact using the following table

		IMPACT		
		1	2	3
URGENCY	1	1	2	3
	2	2	3	4
	3	3	4	5

Urgency	Impact
1 = Immediate	1 Company/Department
2 = Routine	2 = Workgroup
3 - Low	3 – Single user

## A sample dashboard using Tableau

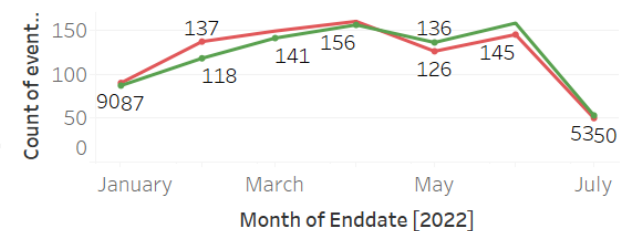
### Ticket Status Distribution over Time



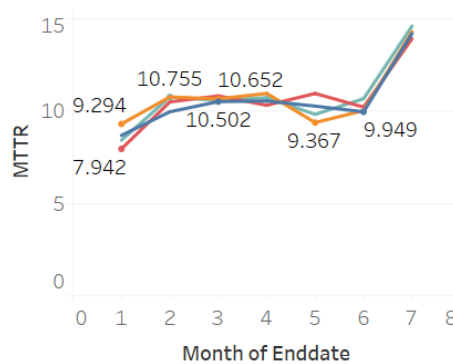
### Ticketstatus

- In Process
- On Hold
- Open

### Deployment Versus Deployed Failed



### MTTR by Class



### Deployment Ratios

