



## Assignment 1B - Full Database Model and Implementation - Fire Damage Assessment System (FDAS)

Assignment weighting 15% - Lecturer in Charge: Dwi Rahayu

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This task continues the work you have started in assignment 1A by refining/extending the model you developed and implementing it as a set of tables under your Monash Oracle database account.

Since this is an ongoing development process based on your assignment 1A submission and marker feedback, ***you must ensure that your assignment 1A submission and the marker feedback remains confidential and is only seen by yourself and the FIT2094-FIT3171 teaching staff.***

Assignment 1B's brief must be read in conjunction with the assignment 1A brief - i.e. your final model must encompass both sets of requirements.

You may modify your assignment 1A conceptual model in any manner you wish as you work through assignment 1B, provided your final model meets both sets of requirements.

**In developing your final logical data model, composite attributes present on your conceptual model must be expanded into their component simple attributes, unless otherwise directed. If the supplementary material presented in this document does not guide you in deciding the components you may make any reasonable decision on their component simple attributes.**

Further research has revealed that the FDAS must keep full historical details of all building fire damage. The following points need to be considered in your further development:

A building may be damaged due to a fire event:

- If the building is partially damaged the building will be repaired. If further permits are required to facilitate this repair the FDAS system will not record their details, the FDAS will only maintain the original approval under which the building was built.
- If the building is damaged beyond repair the owner may choose to rebuild. If they do rebuild the new building will be assigned a new building number for that property. The date the new building was approved for construction and the size of the new building in square metres will be recorded within the FDAS.

Fire assessors, which are identified by an `assessor_id`, may change employment from one insurer to another (they cannot assess for multiple insurers at the same time). To keep track of the historical employment of a particular assessor the date at which they started assessing for a particular company is recorded. When they leave employment with a particular insurer the date they stopped assessing for that company is also recorded.

Since the owner name for a property may be an individual's name, a business name or the name of the body corporate, the FDAS requires that the owner name not be treated as a composite attribute. FDAS is also happy to keep the Chief Executive Officer's name for an LGA and all contact phone numbers as simple attributes.

The property types which FDAS currently record are: "farm property, a residential property (in a city or town) or a business property". Discussions have indicated that this range of property types needs to be expanded and be such that it can be added to/modified as needed on a regular basis.

When a new fire is detected, it is added to the FDAS immediately. Initially, attributes which record the impact of the fire, such as area burnt, are set to 0 and will be updated as the fire proceeds and data is gathered. After a fire passes through a particular area, first level responders (fire personnel or police officers) move through the area and record details of buildings which have been damaged and whether the building has been totally destroyed or not. These details are then added into the FDAS. Note that FDAS are not interested in recording details about the first level responders, only the property damage they note.

At a later stage, when the site is safe, insurance companies will schedule assessor visits to those buildings which were insured at the time of the fire impact. Assessor visits will be added to the FDAS after the visit has been completed. The assessor will provide the damage cost for an insured building when they have completed all necessary visits.

Buildings which are not insured will have their damage cost estimated by the LGA on the basis of the recorded LGA building value.

## FDAS Sample forms

### 1. Fire Event Report

#### Details of Fire Event:

**ID** F20200135  
**Name** West Forrest Fire  
**Date Started** 13th Jan 2020  
**Lives Lost** 3  
**Total Damage** \$5,000,450.00

#### Building Damage for this Fire Event

Property Id	Building ID	Building Class *	Damage Cost	Totally Destroyed (Y/N)	Insurance Coverage (Y/N)
1234567	1	1	\$523,000.00	Y	Y
1234567	2	10	\$23,000.00	Y	Y
2134578	1	1	\$15,100.00	N	N
3678901	1	1	\$235,000.00	N	Y
3678901	2	4	\$45,000.00	Y	N
3678901	3	10	\$12,000.00	N	Y

... small sample only shown

\* Building Class is the National Construction CodeClass-  
<https://www.vba.vic.gov.au/surveying/regulatory-framework/building-classes>

Note the column "Insurance Coverage (Y/N)" on this form indicates if the *fire damage* incurred by the building is covered by insurance or not

## 2. Building Damage Assessment Visits

Note that the attribute "Building Value" shown below is assigned to the building by the LGA and updated annually as part of the LGA rate process.

Sample 1:

### **Building Damage Assessment Visit Report**

**Property ID** 1234567  
**Property Address**  
**Street** 69 Wide Rd  
**Town** West Forrest  
**Postcode** 3123  
**LGA Code** 45  
**LGA Name** Wardinia  
  
**Building ID** 1  
**LGA Building Value** \$523,00  
**Building Class** 1  
  
**Fire Event ID** F20200135  
  
**Assessor ID** 789  
**Given Name** Peter  
**Family Name** Checker

#### **Visits:**

<b>Date and Time Arrived</b>	<b>Date and Time Departed</b>
17th Jan 2020 09:00	17th Jan 2020 11:30
17th Jan 2020 14:00	17th Jan 2020 16:00
19th Jan 2020 13:00	19th Jan 2020 15:30

Sample 2:

## Building Damage Assessment Visit Report

**Property ID** 1234567  
**Property Address**  
    **Street** 69 Wide Rd  
    **Town** West Forrest  
    **Postcode** 3123  
**LGA Code** 45  
**LGA Name** Wardinia  
  
**Building ID** 2  
**LGA Building Value** \$23,000  
**Building Class** 10  
  
**Fire Event ID** F20200135  
  
**Assessor ID** 531  
**Given Name** Mary  
**Family Name** Rater

### Visits:

Date and Time Arrived	Date and Time Departed
17th Jan 2020 13:30	17th Jan 2020 14:54

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**REMEMBER** you must keep up to date with the ed Assignment 1B forum where further clarifications may be posted (this forum is to be treated as your client).

Please be careful to ensure you do not post anything which includes your reasoning, logic or any part of your work to this forum, *doing so violates Monash plagiarism/collusion rules* and has significant academic penalties.

You are free to make assumptions if needed however they must align with the details here and in the assignment forums and must be clearly documented (see the required submission files).

## TASKS

Please **ENSURE** your **name and ID are shown on every page of any document you submit**. If a document is a multipage document, please also make sure you include page numbers on every page.

### GIT STORAGE

All working files, as you work on this assignment task, ***must be stored in GIT and must show a clear history of development***. Your work for this task **MUST** be saved in your local repo in your Assignment 1B folder **and regularly pushed to the FIT GitLab server** to build this history of development. Any submission with less than three pushes for your model will incur a grade penalty of 10 marks (a 10 mark deduction).

Before submission via Moodle you **must** log into the [web interface of the FIT GitLab server](#) and ensure your files are present.

**All source documents** must be available in your FIT GitLab server account and must not be modified in any manner after you have made your Moodle submission. *For example with your normalisation you are required to submit a PDF copy of your work, however your source documents (MS Word, Pages or an MS Word export from Google Docs) must exist in your FIT GitLab account for your work to be acceptable for marking.*

#### Task to complete:

1. Perform **normalisation to 3NF** for the data depicted in the sample FDAS reports. Note that only one normalisation is required for the Building Damage Assessment Report, you have been provided with two samples so you can appreciate some of the variety which occurs.

The approach you are required to use is the same approach as shown in the normalisation tutorial solution. *The normalisation must be carried out form by form, beginning by you representing the document you are working on as a **single UNF form**.*

During normalisation, you must:

- **Not** add surrogate keys.
- Include all attributes (you must **not remove** any attribute as derivable)
- Clearly show UNF, 1NF, 2NF and 3NF.
- Clearly identify the Primary Key in all relations.
- Clearly identify **all dependencies** at the various normalisation stages (Partial at 1NF, Transitive at 2NF and Full at 3NF). You may use a dependency diagram or alternative notation (see the normalisation tutorial sample solution for a possible alternative representation). If none exist you must note this by stating: *No partial dependencies present* and/or *No transitive dependencies present*
- If required, carry out attribute synthesis.

The attribute names used in your normalisation and those on your subsequent logical model must be the same.

2. Based on your assignment 1A conceptual model, your markers feedback, your reading of this case study and the normalisations you carried out in step 1 above, **prepare a logical level design** for the Fire Damage Assessment System database.
  - The logical model must be drawn using the Oracle Data Modeler. The information engineering or Crow's foot notation must be used in drawing the model. Your logical model must **not** show datatypes.
  - All relations depicted must be in 3NF
  - You are required to add at least one surrogate key to your design (you are free to select the most appropriate relation to make this change in)
  - All attributes must be commented **in the database** (ie. the comments must be part of the table structure, not simply comments in the schema file).
  - Check clauses/look up tables must be applied to attributes where appropriate.
  - You **MUST** include the legend as part of your model.
  - Note that your GIT repository must clearly indicate your development history with multiple commits/pushes as you work on your model.
3. **Generate the schema for the database** in Oracle Data Modeler and use the schema to create the database in your Oracle account. The **only** edits you are permitted to carry out to the generated schema file is to add header comment/s containing your details (student name/id) and the commands to turn on and off spool/echo for your script. Ensure you:
  - Capture the output of the run of your schema statements using the spool command.
  - Ensure your script includes drop table statements at the start of the script.
  - Name the schema file as **fdas\_schema.sql**.

## Submission Requirements

### Assignment 1B:

Due: Wednesday 14th October 2020 (Week 9) 5 PM

The following **files** are to be submitted and **must exist** in your FITGitLab server repo, *along with the source documents from which they were generated*:

- A pdf document showing your full normalisation of the sample FDAS documents showing all normal forms (UNF, 1NF, 2NF and 3NF). Name the file **fdas\_normalisation.pdf**
- A single page pdf file containing the final logical Model you created in Oracle Data Modeller. Name the file **fdas\_logical.pdf**. This pdf must be created via File - Data Modeler - Print Diagram - To PDF File from within SQL Developer, do not use screen capture.
- A zip file containing your Oracle data modeler project (in zipping these files be sure you include the .dmd file and the folder of the same name). Name the file **fdas\_oraclemodel.zip**.
  - Part of the assessment of your submission will involve your marker extracting your model from this zip, opening it in SQL Developer Data Modeller, engineering to a new Relational model and from this your marker will generate a schema which will then be compared with your submitted schema (they must be the same for your schema to be accepted). For this reason your **model must be able to be opened by your marker and contain your full model (both logical and relational models) otherwise your task 2 and 3 will not be able to be marked resulting in the loss of 60 marks**. For this reason, you **MUST** carefully check that your model is complete - ensure you take your submission archive, copy it to a new temporary folder, extract your submission parts, extract your model and ensure it opens correctly **before** submission. Please view the video on Moodle under week 6 which demonstrates this process.
- A schema file (CREATE TABLE statements) generated by Oracle Data Modeller. Name the file **fdas\_schema.sql**
- The output from SQL Developer spool command showing the tables have been created. Name the file **fdas\_schema\_output.txt**
- A pdf document containing any assumptions you have made in developing the model or comments your marker should be aware of. If you have made no assumptions submit the document with a single statement saying "No assumptions made". Name the file **fdas\_assumptions.pdf**

These files must be *submitted as individual files ie. you must upload to Moodle six separate files as named above* (the six files must *not* be zipped into a single archive) before the assignment due date/time.

***Late submission will incur penalties at the rate of 5 marks deduction per 12 hours or part thereof.***




Please note we **cannot mark any work on the FITGitLab Server**, you need to ensure that you submit correctly via Moodle since it is only in this process that you complete the required student declaration without which work **cannot be assessed**.

It is your responsibility to **ENSURE** that the files you submit are the correct files - we strongly recommend after uploading a submission, and prior to actually submitting in Moodle, that you download the submission and double-check its contents.

Your assignment **MUST** show a status of "Submitted for grading" before it will be marked.

## Submission status

Attempt number	This is attempt 1.
Submission status	Submitted for grading 
Grading status	Not graded

If your submission shows a status of "Draft (not submitted)" it will not be assessed and **will incur late penalties after the due date/time**.

Please **carefully** read the documentation under "Assignment/Tutorial Task Submission" on the Moodle Assessments page.

## Marking Rubric

	Outstanding (Range HD)	Adequate (Range P - D)	Not Adequate (N)
Understand and follow normalisation methodology [35 marks]	<p>All/majority of the normalisation steps have been correctly followed:</p> <ul style="list-style-type: none"> <li>• All/most normalisation processes are correct</li> <li>• Dependency diagrams have been provided and match normalisation.</li> <li>• Normalisation result is correctly integrated into logical model</li> </ul>	<p>Some of the normalisation steps have been correctly followed:</p> <ul style="list-style-type: none"> <li>• Majority of Normalisation processes are correct</li> <li>• Dependency diagrams have been provided and match normalisation in the majority of situations.</li> <li>• Majority of normalisation result is correctly integrated into logical model</li> </ul>	<p>Few of the normalisation steps have been correctly followed:</p> <ul style="list-style-type: none"> <li>• Significant errors during the Normalisation processes</li> <li>• Dependency diagrams not provided or have major errors</li> <li>• Normalisation result is not correctly integrated into logical model</li> </ul>
Identify the data requirements to support an organisation's operations from the supplied case study and express these via a database logical model. [50 marks]	<p>All FDAS operations are supported:</p> <ul style="list-style-type: none"> <li>• All/most required relations identified.</li> <li>• All relations are in 3NF</li> <li>• All/most required relationships have been captured by placing FK in correct relation</li> <li>• All/most required cardinality and connectivity have been captured</li> <li>• All/most data types and data integrity requirements (Entity, Referential, Domain) have been correctly identified</li> </ul>	<p>Some of the FDAS operations are supported:</p> <ul style="list-style-type: none"> <li>• Majority of relations identified.</li> <li>• Majority of relations are in 3NF</li> <li>• Majority of required relationships have been captured by placing FK in correct relation</li> <li>• Majority of required cardinality and connectivity have been captured</li> <li>• Majority of data types and data integrity requirements (entity, referential, domain) have been correctly identified</li> </ul>	<p>Few of the FDAS operations are supported:</p> <ul style="list-style-type: none"> <li>• None/few of relations identified.</li> <li>• Majority of relations are not in 3NF</li> <li>• None/few required relationships have been captured. Majority of FKs are placed in incorrect relations.</li> <li>• None/few of required cardinality and connectivity have been captured</li> <li>• None/few of data types and data integrity requirements (entity, referential, domain) have been correctly identified</li> </ul>

## Marking Rubric continued

	Outstanding (Range HD)	Adequate (Range P - D)	Not Adequate (N)
Able to generate a relational model and schema given a logical model in SQL Developer. [ 10 marks]	<p>All/majority of the schema generation processes have been correctly followed:</p> <ul style="list-style-type: none"> <li>• SQL Developer Relational model correctly generated from the logical model</li> <li>• All drop commands, database comments and spool command included</li> <li>• No “extra” edit in schema file</li> <li>• The DDL script was executed without errors.</li> </ul>	<p>Some of the schema generation processes have been correctly followed:</p> <ul style="list-style-type: none"> <li>• SQL Developer Relational model correctly generated from the logical model</li> <li>• Some of drop commands, database comments and spool command included</li> <li>• The DDL script was executed without errors.</li> </ul>	<p>Few of the schema generation processes have been correctly followed:</p> <ul style="list-style-type: none"> <li>• SQL Developer Relational model not correctly generated from the logical model</li> <li>• There is “extra” edit (other than identity information and set echo/spool commands) in schema file</li> <li>• The DDL script was executed with errors.</li> </ul>
Able to correctly use the required notation convention and be consistent in its usage. See page 11-12 of the week 6 tutorial notes. [5 marks]	All notations in the model are consistent and follow FIT2094-FIT3171 Logical Model standards.	Most notations in the model are consistent and follow FIT2094-FIT3171 Logical Model standards.	Few notations in the model are consistent or follow FIT2094-FIT3171 Logical Model standards.
Able to correctly push all files to FITGitLab server with a development history of <b>at least three pushes of your model</b> .			If less than three pushes (for the model) showing a clear development history, a grade deduction of 10 marks applied.