

# HW 1 - Normalization

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## Overview

- Assignment points: 10 points or **10%** toward your final grade.
- Due date: **9/17/2020, 11:59 pm**.
- Late submission: grace period of 2 days with 20% late penalty. After that time, assignment will NOT be accepted.
- Submission: submit your assignment in PDF format in Canvas. You can use word, excel or similar tools and convert into pdf.

## Instructions

- Go through below form with all data elements/attributes and organize all attributes to create 3NF design to remove data redundancy and dependency.
- Your un-normalized, 1st and 2nd normal forms will NOT be scrutinize for grading purposes. They are the means to the end (3NF). However, you need to display unnormalized, 1<sup>st</sup> NF, 2<sup>nd</sup> NF and 3<sup>rd</sup> NF, as shown in below sample output.
- Identify each **ENTITY** names by highlighting them in **yellow color** and list each attributes.
- Identify the **Primary Keys** and **Foreign Keys**, if any, and show them within a bracket next to the field name, e.g. **OrderID (PK)**, **ProductID (FK)**, etc. and highlight them in a different color other than yellow e.g. **grey color**.
- If an entity does not change from 1st to 2nd normal form, then simply copy over the data into the 2nd normal form to show that the data is already in second normal form, and so on.
- Your final 3NF should contain all data in the document organized by entity, listing all attributes in each entity with primary and foreign keys, if any.
- Ensure that each attribute is functionally dependent on the primary key for that entity. If an attribute appears multiple times, list it only once in your final normalization design.

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**Example of Normalization Sample output:**

<b>Tabular form:</b>				
<b>UNNORMALIZED</b>		<b>1st NF</b>	<b>2nd NF</b>	<b>3rd NF</b>
project_code		<b>Project</b>	<b>Project</b>	<b>Project</b>
project_title		project_code	project_code	project_code (PK)
project_manager		project_title	project_title	project_title
project_budget		project_manager	project_manager	project_manager
employee_no		project_budget	project_budget	project_budget
employee_name				
Dept_no		<b>Employee</b>	<b>Proj_Emp</b>	<b>Proj_Emp</b>
Dept_name		project_code	project_code	project_code } (PK)
Hourly_rate		employee_no	employee_no	employee_no }
		employee_name	Hourly_rate	Hourly_rate
		Dept_no		
		Dept_name	<b>Employee</b>	<b>Employee</b>
		Hourly_rate	employee_no	employee_no (PK)
			employee_name	employee_name
			Dept_no	Dept_no (FK)
			Dept_name	
				<b>Department</b>
				Dept_no (PK)
				Dept_name

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### INPUT

Please use below form and normalize into 3 NF.

#### School of Computing

Course ID	CSCI 3287		
Course Name	Database System		
Instructor ID	12345		
Instructor Name	Mark West		
Student Name	DOB	Gender	Grade
Alex Smith	9/10/1997	F	90
Ravi Grace	1/15/1999	M	95
Tom Ford	2/10/1998	M	80
Lily Mars	3/20/1999	F	85

#### Assumptions:

This form represents the School of Computing record of all the courses it offers - one document for each course. Here sample data given for Database System course with instructor and list of students.

- Each course has only one instructor, however Instructor may teach more than one courses.
- Students may register for several course, i.e. different courses will have different numbers of students.
- Student's grade will be different for different courses.

Sample data are given for illustration purposes only. You just need to use entities/attributes and normalize into 3NF as shown in sample output above. If there is no obvious primary key, then create appropriate primary key.