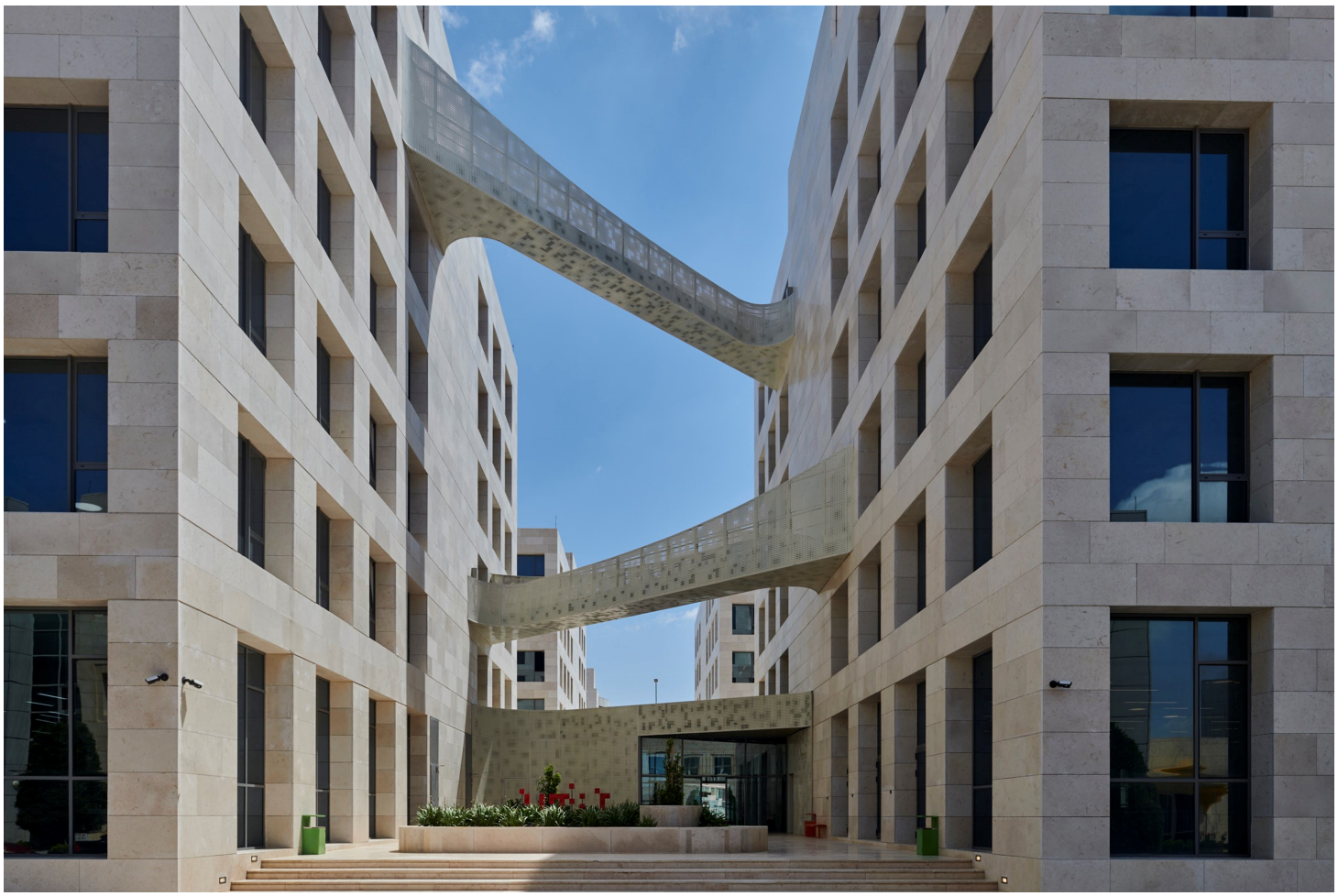
جامعة الحسين التقنية
Al Hussein Technical University

ASSIGNMENT BRIEF

HTU Course No: 40201200	**HTU Course Name:** Advanced Programming
BTEC Unit Code: Y/615/1651	**BTEC UNIT Name:** Advanced Programming

Version: 3



Student Name/ID Number/Section	
HTU Course Number and Title	40201200 Advanced Programming
BTEC Unit Code and Title	Y/615/1651 Advanced Programming
Academic Year	2023-2024 Spring
Assignment Author	Sultan Alrushdan
Course Tutor	Ahmad Bataineh - Sultan Alrushdan - Mustafa Al-Smady - Asma'a Lafi
Assignment Title	Design and Implement Data Processing Application
Assignment Ref No	1
Issue Date	21/04/2024
Formative Assessment dates	From 28/04/2024 to 30/05/2024
Submission Date	09/06/2024
IV Name & Date	Balqees Aldabaibeh 20/04/2024

Submission Format

Submission for this assignment is expected to be an **individual written report**. This report should be:

1. In a form of a **soft copies (.docx)** submitted to the university's eLearning system within the deadline specified above at https://elearning.htu.edu.jo.

2. System source code (compressed file) that contains "src" folder. Source code should be uploaded to the university's eLearning system.

Notes:

- You should submit a signed Declaration form.
- An oral discussion with your assessors illustrating your assignment and answering questions.

Report guidelines:

In your report, you should make use of headings, paragraphs, and subsections as appropriate. The expected word limit is 1000-3000 words (that is about 15-25 pages with images), although you will not be penalized for exceeding the total word limit, do your best to be within the word limit. Your report should be:

- In a form of soft copies submitted to the instructor.
- Written in a formal business style using single spacing and font size 12, of times roman.
- Must be supported with research and referenced using the Harvard referencing system.

Unit Learning Outcomes

LO1 Examine the key components related to the object-orientated programming paradigm, analysing design pattern types.

LO2 Design a series of UML class diagrams

LO3 Implement code applying design patterns.

LO4 Investigate scenarios with respect to design patterns.

Assignment Brief and Guidance

A university maintain information about departments, employee, students and students information, the information are arranged in 4 files as shown bellow:

Department Information

Field 1: Department ID

Field 2: Department Name
Field 3: Department Establishment Date

Employee Information
Field 1: Employee ID (Unique ID of Professor)
Field 2: Date of Birth
Field 3: Date of Joining
Field 4: Department ID where the Professor Belongs to.

Student Counceling Information
Field 1: Student ID
Field 2: Date of Admission
Field 3: Date of Birth
Field 4: Choice of department a student submitted
Field 5. Department name (Student get admitted)

Student Performance Data
Field 1: Student_ID
Field 2: Semester_Name
Field 3: Paper_ID
Field 4: Paper_Name
Field 5: Marks

The Data file are provided with this Assignment Brief

The university need to develop a software to manage the university information. The software should perform the following functionalities:

- Retrieve the information of specific department, Employee, Student Counceling and Student Performance based on a given ID.
- Retrieve all students' information for students in a given department, date of birth within a range and Date of Admission within a range.
- Perform statistical operation on student Performance info for specific students such as number of papers, number of semesters, average , sum, max and min marks.
- Perform statistical operation on department such as number on Employee, number of student.
- Retrieve the student info and employee info that belong to specific Department.

Perform the following Tasks:

1. Design a UML class diagram that represents a dataset processing application for the dataset described above.
2. Refine your design by using design pattern to enhance the operation of your software and justify your choices.
3. Analyze how can the UML class diagram extracted from a given scenario, use the scenario above and your UML design as an example.
4. Examine the characteristics of Object Oriented Design and class relationships, provide examples of your project.
5. Determine the design Pattern for each of Creational, Structural and Behavioral patterns types.

6. Design Patterns have a positive impact on Object Oriented Design, Analyze the impact of Design Patterns on object oriented design listing advantages and strengths, support your findings with evidence and examples.
7. Use java programming language to Build the dataset processing application you designed in Task 1.
8. Use java programming language to Build the dataset processing application you designed in Task 2
9. Evaluate how the use of design pattern for enhancing application development of your code (provide evidence) from Task 8.
10. When to use creational, structural and behavioral Design patterns, Provide an examples of.
11. Choose a suitable design pattern for the following cases.
    1. The constructor of a class have many parameters (6 or more) some of are mandatory the others are optional.
    2. An object is created and used in many different location in the system and may be created by many different developers.
    3. Represent a large object that should be loaded on demand and avoids duplication of the same object.
    4. in shopping site: the user adds items to the basket and by the end on checkout, the user can choose the payment method in runtime: PayPal, Credit Card and so on.
12. In the previous question (Task 11) justify your choice of Design pattern.

Learning Outcomes and Assessment Criteria			
Learning Outcome	**Pass**	**Merit**	**Distinction**
LO1 Examine the key components related to the object-orientated programming paradigm, analysing design pattern types.	**P1** Examine the characteristics of the object-orientated paradigm as well as the various class relationships.	**M1** Determine a design pattern from each of the creational, structural and behavioural pattern types	**D1** Analyse the relationship between the object-orientated paradigm and design patterns
LO2 Design a series of UML class diagrams	**P2** Design and build class diagrams using a UML tool.	**M2** Define class diagrams for specific design patterns using a UML tool.	**D2** Analyse how class diagrams can be derived from a given code scenario using a UML tool.
LO3 Implement code applying design patterns.	**P3** Build an application derived from UML class diagrams.	**M3** Develop code that implements a design pattern for a given purpose	**D3** Evaluate the use of design patterns for the given purpose specified in M3.
LO4 Investigate scenarios with respect to design patterns.	**P4** Discuss a range of design patterns with relevant examples of creational, structural and behavioural pattern types.	**M4** Reconcile the most appropriate design pattern from a range with a series of given scenarios.	**D4** Critically evaluate a range of design patterns against the range of given scenarios with justification of your choice