جامعة الحسين التقنية
Al Hussein Technical University

ASSIGNEMNT BRIEF

HTU Course No: 40201200 **HTU Course Name:** Advanced Programming	**BTEC Unit No:** T/618/4902 **BTEC Unit Name:** Applied Programming and Design Principles

Assignment Brief Number: 1

Version: 1

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Assessment Brief

Student Name/ID Number/Section	Abdallah Daradkeh/21110446/3
HTU Course Number and Title	40201200 Advanced Programming
BTEC Course Number and Title	T/618/4902 Applied Programming and Design Principles
Academic Year	Spring 2022-2023
Assignment Author	Eng. Asmaa Lafi
Unit Tutor	Eng. Asmaa Lafi, Eng. Malik Al Louzi
Assignment Title	**Dental Care Clinic System**
Assignment Ref No.	**No. 1**
Issue Date	May 14, 2023
Formative Assessment Dates:	Every week until June 1st, 2023
Submission Date	20th June, 2023
IV Name & Date	Hana Alrasheed 7/5/2023

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. Investigate the impact of SOLID development principles on the OOP paradigm.

LO2. Design a large dataset processing application using SOLID principles and clean coding techniques.

LO3. Build a data processing application based on a developed design.

LO4. Perform automatic testing on a data processing application.

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Assignment Brief and Guidance

Scenario:

A dental care clinic (DCC) at medical university provides all type of dental treatment to three types of patients: patient from local community(ordinary), dentist students and dental consultant. Patients consult a doctor by appointment, they required to register by supplying name, address, national number, contact number. Each patient has fees (30 JD) and has discount based on his type; dentist student paid only 50% of the total fees while the consultant paid 20% of the total fees.
DCC consists of one surgery room, so that one patient can be accommodated within half hour of treatment.
The staff at DCC consists of a doctor, a nurse and a receptionist who handle registration and appointment. Each employee at DCC has personal information such as name, address, national number, contact number and job description.
The working hours at DCC is starting at 10:00 am and ends at 7:00 PM.
DCC decided to automate their work by implementing a system to do the following:

- The receptionist should add new patient to the system and reserve an appointment to him, assume that the reservation process is done at the same day of treatment. The appointment include time of having treatment. appointment reservation must be ended at half past six since the workday end by 7:00 PM
- The receptionist should implement calculate bill and print bill functions to any patient based on his national number.
- The receptionist should print all the appointments at the clinic (patient name, patient appointment)
- The doctor should have access to all the patients in the system.
- The doctor should add medicine (each medicine has name and dose) to the patient.
- The doctor should add treatment description to the patient.
- The nurse should issue a report in text format containing all the information of each patient (his national number, his name, his medicines and treatment description at (appointment time))

Your task as s software engineer at software solution company is to develop DCC System. The system must apply the Object Oriented, Design Patterns concepts, SOLID principles and clean coding techniques.
To achieve the above goals, your manager asked you to prepare a full report that contains core information starting from designing the UML Class diagrams and their relationships, then explain the Object-Oriented characteristics, design patterns and SOLID principles.

Part 1:

1.1 Investigate the characteristics of the object orientated paradigm, including inheritance, encapsulation, polymorphism, constructors, abstract, interface, collections, static, class relationships and SOLID principles.
ANd say how you implement them in your code
1.2 Explain how clean coding techniques can impact on the use of data structures and operations when writing algorithms.
1.2 Analyse, with examples, each of the creational, structural and behavioural design pattern types.
1.3 Evaluate the impact of SOLID development principles on object orientated application development.

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Part 2:

2.1 Design and build class diagrams for the Dental Care Clinic system using a UML tool.
2.2 Design a suitable testing methodology for the application, including provision for automated testing.
2.3 Refine the design to include suitable creational, structural and behavioural design patterns.

Part 3:

3.1 Build an application derived from system UML class diagrams (**Code**).
3.2 Assess the effectiveness of using SOLID principles, clean coding techniques and programming patterns on the application developed.
3.3 Analyze the benefits and drawbacks of different forms of automatic testing of applications and software systems, with examples from the developed system.

Part 4:

4.1 Examine the different methods of implementing automatic testing as designed in the test plan.
4.2 Implement automatic testing of the developed system (**Code**).
4.3 Discuss the differences between developer produced and vendor provided automatic testing tools for applications and software systems.

Note: Application should contain a main class that covers all functionalities of the system.

<table>
<tr><th colspan="3">Learning Outcomes and Assessment Criteria</th></tr>
<tr><th>Pass</th><th>Merit</th><th>Distinction</th></tr>
<tr><td colspan="2">LO1. Investigate the impact of SOLID development principles on the OOP paradigm</td><td rowspan="4">D1. Evaluate the impact of SOLID development principles on object orientated application development.</td></tr>
<tr><td>P1. Investigate the characteristics of the object orientated paradigm, including class relationships and SOLID principles.

P2. Explain how clean coding techniques can impact on the use of data structures and operations when writing algorithms.</td><td>M1. Analyse, with examples, each of the creational, structural and behavioural design pattern types.</td></tr>
<tr><td colspan="2">LO2. Design a large dataset processing application using SOLID principles and clean coding techniques.</td></tr>
<tr><td>P3 Design a large data set processing application, utilising SOLID principles, clean coding techniques and a design pattern.
P4 Design a suitable testing regime for the application, including provision for automated testing.</td><td>M2. Refine the design to include multiple design patterns.</td></tr>
<tr><td colspan="2">LO3. Build a data processing application based on a developed design</td><td rowspan="3">D2. Analyse the benefits and drawbacks of different forms of automatic testing of applications and software systems, with examples from the developed application.</td></tr>
<tr><td>P5 Build a large dataset processing application based on the design produced.</td><td>M3. Assess the effectiveness of using SOLID principles, clean coding techniques and programming patterns on the application developed.</td></tr>
<tr><td colspan="2">LO4. Perform automatic testing on a data processing application</td></tr>
<tr><td>P6 Examine the different methods of implementing automatic testing as designed in the test plan.
P7 Implement automatic testing of the developed application.</td><td>M4 Discuss the differences between developer produced and vendor provided automatic testing tools for applications and software systems.</td><td></td></tr>
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STUDENT ASSESSMENT SUBMISSION AND DECLARATION

When submitting evidence for assessment, each student must sign a declaration confirming that the work is their own.

Student name: Abdallah Daradkeh 21110446		**Assessor name: Eng. Asmaa Lafi**
Issue date: 14/05/2023	**Submission date:** 20/06/2023	**Submitted on:** 21/6/2023
Programme: Computing		
HTU Course Name: Advance Programming Design Principles. **HTU Course Code:** 40201200	**BTEC Course Title:** Applied Programming and **BTEC Course Code:** T/618/4902	
Assignment number and title: 1, Dental Care Clinic System		

Plagiarism:

Plagiarism is a particular form of cheating. Plagiarism must be avoided at all costs and students who break the rules, however innocently, may be penalised. It is your responsibility to ensure that you understand **correct referencing practices**. As a university level student, you are expected to use appropriate references throughout and keep carefully detailed notes of all your sources of materials for material you have used in your work, including any material downloaded from the Internet. Please consult the relevant unit lecturer or your course tutor if you need any further advice.

Student declaration

I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice.

Student signature:  **Date:** 21/6/2023