Faculty Name: IT
Qualification Name: IT Software Design and Development
Formative Assessment 1 Paper

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Formative Assessment 1 Paper

Faculty Name:	Information Technology
Qualification Name:	IT Software Design and Software
Module Name:	Programming with C# Semester 1
Module Code:	PRG521
Hand Out:	22 – 07 – 2023
Hand In:	03 – 07 – 2023
Total Marks:	100
Examiner:	Mr Junior Manganyi
Resources Required:	Visual Studio C#

Scenario Question(s)	100 Marks

This Formative Assessment 1 (FA1) contributes 10% towards the final mark.

Instruction(s) to Students

1. All assessments are due at 23:30 (local time) on the specified date.
2. Copying from any source, including other students' work, is strictly prohibited. Plagiarism will result in disciplinary action.
3. Before submitting your assessment, download the "Declaration of Authenticity" form provided from Campus Online. Sign the form and include it as part of your submission.
4. Late submissions will be accepted within a three-day grace period after the closing date. However, there will be a deduction in marks:
5. On the first day, a 5% deduction will be applied, From the second day onwards, the deduction will be 1% per day, up to a maximum deduction of 15%.
6. If you need to submit your assessment during the grace period, you must inform your facilitator.

   It is your responsibility to ensure that you have access to a reliable internet connection and the necessary resources to complete and submit your assessment on time.

Scenario Question(s) 100 Marks

Study the scenario and complete the question(s) that follow:

Rent or Buy Property Application

You requested assistance in using an application to help a family member determine if the amount of money they are paying is sufficient to purchase a house. The family member will use the application to input their gross monthly income (before deductions), estimated monthly tax deducted, and estimated monthly expenditures in various categories. Then they can choose between renting accommodation or buying a property. If they choose to rent, they can input the monthly rental amount. If they choose to buy a property, they must enter the purchase price, total deposit, interest rate, and number of months to repay. The Application will calculate the monthly home loan repayment for buying a property and alert the user if the repayment amount is more than a third of their gross monthly income, indicating that approval of the home loan is unlikely. The Application will also calculate the available monthly money after all specified deductions.

- The coding standards should be internationally acceptable, and the code should include comprehensive comments explaining variable names, methods, and the logic of programming code.
- Submit source code and a readme file with instructions for compiling and running the software:

Source: Manganyi Junior., HOP (2023).

Question 1

Designing and Implementing a Housing Affordability Application

Background:

You have been tasked with designing and implementing a standalone command-line application using C# and Visual Studio to help individuals determine whether they can afford to buy a house based on their financial situation. The application will assist users in making informed decisions by calculating their monthly home loan repayments and assessing affordability based on their gross monthly income and other financial details.

Application Functionality:

The Housing Affordability Application will allow users to perform the following tasks:

Input Details:

Gross Monthly Income: The user will enter their total monthly income before deductions.

Estimated Monthly Tax: The user will provide an estimate of the monthly tax deducted from their income.

Estimated Monthly Expenditures: The user will enter their monthly expenditures in various categories, such as utilities, groceries, transportation, etc.

Choose between Renting or Buying:

- The user can choose to rent accommodation or buy a property.

Renting Accommodation:

- If the user chooses to rent, they will input the monthly rental amount.

Buying a Property:

If the user chooses to buy a property, they must provide the following details:

- Purchase Price: The total cost of the property.
- Total Deposit: The amount the user plans to pay as a down payment.
- Interest Rate: The interest rate on the home loan.
- Number of Months to Repay: The duration of the home loan in months.

Calculate Monthly Home Loan Repayment:

- The application will calculate the monthly home loan repayment for buying property based on the provided details.

Affordability Check:

- The application will assess affordability by comparing the monthly home loan repayment to the user's gross monthly income. If the repayment amount exceeds one-third of the gross monthly income, the application will indicate that the home loan approval is unlikely.

Calculate Available Monthly Money:

- The application will calculate the available monthly money after all specified deductions, including tax and other expenditures.

Coding Standards and Documentation:

- To ensure code quality and readability, follow internationally acceptable coding standards. Add comprehensive comments to explain variable names, methods, and the logic of the programming code, making it easy for others to understand and maintain the application.

Submission Requirements:

- Source Code (ZIP or Archive):
- Submit the complete C# source code files along with the Visual Studio solution in a ZIP or archive format.
- Readme File (PDF or Text):
- Include a readme file providing instructions for compiling and running the software.
- Describe the application's functionalities, user input requirements, and expected outputs.
- Provide step-by-step instructions on how to run the application and test different scenarios.

1.1 Design and implement a standalone command-line application using C# and Visual Studio to accomplish the above scenario.

Criteria and Mark Allocations:

Functionality (30 marks)

- Input Collection: The application effectively collects user input for gross monthly income, estimated monthly tax, and monthly expenditures. It allows the user to choose between renting or buying a property and captures the relevant property details if buying. (10 marks)
- Monthly Repayment Calculation: The application accurately calculates the monthly home loan repayment for buying property based on the provided details. (10 marks)
- Affordability Check: The application correctly assesses affordability by comparing the monthly home loan repayment to the gross monthly income and alerts the user if approval is unlikely. (10 marks)

Code Quality and Standards (20 marks)

- Coding Standards: The code adheres to internationally acceptable coding standards, following proper naming conventions and indentation. (8 marks)
- Comments and Documentation: The code includes comprehensive comments that explain variable names, methods, and the logic of the programming code. (8 marks)
- Code Readability: The code is well-organized, easy to read, and follows best practices to improve code readability. (4 marks)

User Experience (15 marks)

- Clear Instructions: The application provides clear instructions on how to input data, make selections, and interpret the results. (5 marks)
- Error Handling: The application handles user input errors gracefully, providing informative error messages when needed. (5 marks)
- User-Friendly Interface: The user interface is intuitive and guides the user through the process effectively. (5 marks)

Affordability Assessment (15 marks)

- Correct Calculation: The affordability check accurately compares the monthly home loan repayment to one-third of the gross monthly income. (5 marks)
- Correct Affordability Decision: The application correctly determines whether the home loan approval is unlikely based on the affordability check. (5 marks)
- Appropriate Affordability Messaging: The application provides clear and appropriate messages to the user regarding affordability. (5 marks)

Code Efficiency and Optimization (10 marks)

- Efficient Algorithms: The application uses efficient algorithms for calculations, minimizing unnecessary computations. (5 marks)
- Optimization Techniques: The code incorporates optimization techniques to enhance performance and reduce resource usage. (5 marks)

Submission and Readme (10 marks)

- Source Code Submission: The student submits complete C# source code files and the Visual Studio solution in the correct format. (5 marks)
- Readme Content: The readme file contains comprehensive instructions for compiling, running, and testing the application. (5 marks)

[Total = 100 Marks]

End of Section 1