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UNIVERSITI TEKNOLOGI MALAYSIA

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MID SEMESTER TEST (PRACTICAL)
SEMESTER 1, 2024/2025

SUBJECT CODE	**:**	**SECJ1013**
SUBJECT NAME	**:**	**PROGRAMMING TECHNIQUE I**
SECTION	**:**	**01-09**
TIME	**:**	**2 HOURS 30 MINUTES (8:00 - 10:30 PM)**
DATE/DAY	**:**	**11 DECEMBER 2024 (WEDNESDAY)**
VENUES	**:**	**N28 (MPK1-10, CGMTL)**

INSTRUCTIONS:

- This test consists of **TWO (2)** questions with a total of 100 marks. You must **answer all questions.**
- This is a **CLOSED-BOOK** practical test. You will complete the test by coding on a computer.
- You are provided with reference resources. **ONLY** the provided resources are **allowed** for reference.
- Referencing any other resources, including source codes, websites, or external materials, is **STRICTLY PROHIBITED.**
- The use of any artificial intelligence tools (e.g., ChatGPT, AI-based IDE extensions like Co-Pilot) is **STRICTLY PROHIBITED**.
- Perform all coding **offline** using a C++ IDE such as VS Code, DevCPP, etc.
- You must use the PC provided in the lab. Using your own computer is **NOT ALLOWED.**
- Your program will be screened for **plagiarism detection**. Ensure your work is original.
- **NO technical assistance** will be provided during the test. This includes issues such as IDE malfunctions or compilation errors. You are responsible for resolving these issues on your own.
- Questions related to the test question will not be entertained. Please read the questions carefully.
- **COMMENT STATEMENTS** in your submitted program **WILL NOT BE EVALUATED**.

TEST SETUP:

This test provides essential resources, including starter code and slides, which are the only materials you may use during the test.

1. Download the **secj1013_test2.zip** file from the link available on eLearning.
2. The ZIP file is password-protected, and the password will be given at the start of the test.
3. Once the password is received, extract the ZIP file. Inside, you will find a folder named **FULLNAME MATRICNUMBER** .
4. Rename this folder using your matric number and full name (spaces are allowed). Example: *NUR AINA BINTI AZMAN A23CS4567*
5. Use the renamed folder as your project directory for all test questions.
6. Launch your IDE from this folder to begin working.

SUBMISSION:

1. When the test ends, step away from your computer and wait for your turn to submit.
2. The test invigilator will manually collect your program files.
3. During submission, copy only the renamed folder (as instructed earlier) to the provided portable storage device using the "**Send to"** option.
4. Leaving the test room is strictly prohibited until the invigilator grants permission.

QUESTION 1 - ERROR DEBUGGING **[35 MARKS]**

Notes: Question 1 provides a code file named **program1.cpp** that contains errors. Modify this program to meet the requirements specified in the question.

You are given a C++ program containing **TEN (10) errors** (including syntax and/or logical errors). The program is designed to manage a car rental system by calculating rental rates for various car models. It includes **FOUR (4) user-defined functions** as described in Table 1 below:

Table 1: User-defined functions

Function Name	**Description**
`displayMenu`	Displays the program's main menu. Users are prompted to enter input based on the displayed options. The function repeatedly asks the user to enter a valid number (1, 2, or 3) to select an option.
`displayCar`	Displays the list of available car models for rent along with their respective rental rates per hour.
`displayRentalRate`	Displays the list of rental rates based on the number of rental hours.
`calcRentCar`	Calculates the total rental charge for the user based on the selected car model and the number of rental hours.

The main function of the program allows users to select from three main options: (1) View the list of available cars for rent, (2) Make a rental, and (3) Exit the program. The main function is designed to obtain several input data from users and display rental information after users complete the rental process. The rental charges are calculated based on the selected car model and the number of rental hours.

You are required to debug the program by identifying and fixing all errors, including both syntax and logical errors. Once the errors have been resolved, compile and execute the program to ensure it functions as intended. You are **NOT ALLOWED TO REMOVE** any existing statements from the program. You are only **ALLOWED TO UPDATE** the provided statements or add new statements if necessary to correct the program and achieve the desired functionality.

Important:

- Comment every line of code where you make updates or modifications.
- Use numbered comments (e.g., **`//Error 1`**, **`//Error 2`**) to track your changes clearly.

The program should produce the outputs as in **Figure 1** below. ***Note:*** The values displayed in **bold** represent inputs entered by the user.

Execution 1

```
---------------------------------
Car Rental Program
---------------------------------
Choose the following options.
1. Display list of available car.
2. Rent a car.
3. Exit Program.
---------------------------------
Option : 1

-------------------------------------
List of available car
-------------------------------------
No.     Model           Rate Per Hour
1.      Honda Civic     Rm10.00
2.      Proton X70      Rm15.00
3.      Toyota Yaris    Rm7.00
4.      Perodua Axia    Rm5.00
-------------------------------------

Enter 'y' to continue and 'n' to exit the
program : n

Program End.
```

Execution 2

```
---------------------------------
Car Rental Program
---------------------------------
Choose the following options.
1. Display list of available car.
2. Rent a car.
3. Exit Program.
---------------------------------
Option : 4
Invalid option! Enter valid option (1,2,3)
: 2

-------------------------------------
List of available car
-------------------------------------
No.     Model           Rate Per Hour
1.      Honda Civic     Rm10.00
2.      Proton X70      Rm15.00
3.      Toyota Yaris    Rm7.00
4.      Perodua Axia    Rm5.00
-------------------------------------
The following rental rate calculation is
as follows :
- Normal rate for the first 12 hours.
- Next 12 hours, the rate increase by 2%.
- After 24 hours, the rate increase by 5%
```

Execution 3

```
---------------------------------
Car Rental Program
---------------------------------
Choose the following options.
1. Display list of available car.
2. Rent a car.
3. Exit Program.
---------------------------------
Option : 1

-------------------------------------
List of available car
-------------------------------------
No.    Model         Rate Per Hour
1.     Honda Civic   Rm10.00
2.     Proton X70    Rm15.00
3.     Toyota Yaris  Rm7.00
4.     Perodua Axia  Rm5.00
-------------------------------------

Enter 'y' to continue and 'n' to exit the
program : y

---------------------------------
Car Rental Program
---------------------------------
Choose the following options.
1. Display list of available car.
2. Rent a car.
3. Exit Program.
---------------------------------
Option : 2

-------------------------------------
List of available car
-------------------------------------
No.    Model         Rate Per Hour
1.     Honda Civic   Rm10.00
2.     Proton X70    Rm15.00
3.     Toyota Yaris  Rm7.00
4.     Perodua Axia  Rm5.00
-------------------------------------
The following rental rate calculation is
as follows :
- Normal rate for the first 12 hours.
- Next 12 hours, the rate increase by 2%.
- After 24 hours, the rate increase by 5%

Enter your name : James
Choose car model no. : 3
Enter hour(s) to rent : 52

--------------------------
```

```
Enter your name : Amira
Choose car model no. : 1
Enter hour(s) to rent : 16

---------------------------
Rental Details
---------------------------
Name : Amira
Car model : Honda Civic
Hour(s) rent : 16
Total rent : RM160.8
---------------------------

Enter 'y' to continue and 'n' to exit the
program : n

Program End.
```

```
Rental Details
---------------------------
Name : James
Car model : Toyota Yaris
Hour(s) rent : 52
Total rent : RM375.48
---------------------------

Enter 'y' to continue and 'n' to exit the
program : y

---------------------------------
Car Rental Program
---------------------------------
Choose the following options.
1. Display list of available car.
2. Rent a car.
3. Exit Program.
---------------------------------
Option : 3
Program End.
```

Figure 1: Example of program outputs

QUESTION 2 - PROBLEM SOLVING **[65 MARKS]**

Notes: Question 2 provides a code file named **program2.cpp**. Modify this program to address the requirements of the question.

Develop a C++ program to convert a specified amount from a chosen foreign currency into Malaysian Ringgit (MYR). The program should present a menu for users to select the desired foreign currency and display the exchange rates, and allow users to choose their preferred Malaysian banknotes for conversion. Use **Table 2** and **Table 3** for the necessary calculations.

Table 2: Currency and Exchange Rate

Code	Country Currency Name	Currency Symbol	Exchange Rate to MYR
I	Indonesian Rupiah	IDR	0.000286
B	Bangladeshi Taka	BDT	0.0378
C	Chinese Yuan	CNY	0.62

Table 3: Malaysian Banknotes

Code	Value
A	MYR 100
B	MYR 50
C	MYR 20
D	MYR 10
E	MYR 5
F	MYR 1

Complete the following tasks in your program:

1. Define constants for the currency symbols and their corresponding exchange rates.

(3 marks)

2. Define a function that returns the code of a Malaysian banknote. This function should:

a. Take a parameter representing the amount in MYR.
b. Display banknotes that are less than or equal to the amount (e.g., for MYR 15, display MYR 10, MYR 5, and MYR 1).
c. Allow the user to choose a banknote code.

(9 marks)

3. Define a function to return the value of a Malaysian banknote based on its code. For example, code 'A' returns 100.0; 'B' returns 50.0; and so on.

(4 marks)

4. In the main function, write the code for the followings:
    a. Prompt the user to select a currency code from a menu. (4 marks)
    b. Determine the currency symbol and exchange rate based on the selected code. (7 marks)
    c. Ask the user to enter the amount in the selected foreign currency. (5 marks)
    d. Display the converted amount in MYR, showing both the original and the rounded-up value. Examples: if the converted value is 5.68, round to 6.0. If the converted value is 5.05, round to 6.0. If the converted value is 5.0, keep as 5.0. (7 marks)
    e. Allow the user to repeatedly select Malaysian banknotes to represent the converted MYR amount until the balance is zero. (11 marks)

5. In addition to the above requirements, your program will also be evaluated based on the following criterias:
    a. Successful compilation and execution.
    b. Program structure: clear use of functions, variables, conditional statements, and loops.

(15 marks)

Figure 2 below shows an example output of the program. ***Note:*** The values in **bold** are input by the user.

Execution 1

```
Pick a currency to convert from:
I. Indonesian Rupiah (IDR)
B. Bangladeshi Taka  (BDT)
C. Chinese Yuan  (CNY)

Choose a code => C
Enter the amount of money in your original currency CNY => 4560

Your conversion money is MYR 2827.2
You will get MYR 2828

How would you like your money?
A. MYR 100
B. MYR 50
C. MYR 20
D. MYR 10
E. MYR 5
F. MYR 1

Choose a bank note => A

Your money in bank note MYR 100 : 100 x 28 = MYR 2800
You still have a balance of MYR 28

How would you like your money?
C. MYR 20
D. MYR 10
E. MYR 5
F. MYR 1

Choose a bank note => C

Your money in bank note MYR 20 : 20 x 1 = MYR 20
You still have a balance of MYR 8

How would you like your money?
E. MYR 5
F. MYR 1

Choose a bank note => E

Your money in bank note MYR 5 : 5 x 1 = MYR 5
You still have a balance of MYR 3

How would you like your money?
F. MYR 1

Choose a bank note => F

Your money in bank note MYR 1 : 1 x 3 = MYR 3

There you go. You have all your money back
Have a nice day!
```

Execution 2

```
Pick a currency to convert from:
I. Indonesian Rupiah (IDR)
B. Bangladeshi Taka  (BDT)
C. Chinese Yuan  (CNY)

Choose a code => I
Enter the amount of money in your original currency IDR => 1000000

Your conversion money is MYR 286
You will get MYR 286
```

```
How would you like your money?
A. MYR 100
B. MYR 50
C. MYR 20
D. MYR 10
E. MYR 5
F. MYR 1

Choose a bank note => B

Your money in bank note MYR 50 : 50 x 5 = MYR 250
You still have a balance of MYR 36

How would you like your money?
C. MYR 20
D. MYR 10
E. MYR 5
F. MYR 1

Choose a bank note => D

Your money in bank note MYR 10 : 10 x 3 = MYR 30
You still have a balance of MYR 6

How would you like your money?
E. MYR 5
F. MYR 1

Choose a bank note => F

Your money in bank note MYR 1 : 1 x 6 = MYR 6

There you go. You have all your money back
Have a nice day!
```

Figure 2: Example of program outputs