

(SECJ1013) PROGRAMMING TECHNIQUE 1

SEM 1, SESSION 2023/2024

LAB EXERCISE 3 (4%)

INSTRUCTIONS TO THE STUDENTS

- This exercise must be done individually.
- Any form of plagiarism is **NOT ALLOWED**. Students who copied other students' assignments will get **ZERO** marks (both parties, students who copied, and students who shared their work).

SUBMISSION PROCEDURE

- Please submit this exercise no later than **December 21, 2023, Thursday (1 PM MYT)**.
- Only hardcopy is accepted for this submission with handwriting (at my office – n28a, level 2, room 02-31-01).

Fill your information here:

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SET 1

The following program code has errors. Locate the errors.

Line	C++ Codes
1	#include <iostream>
2	using namespace std;
3	
4	// function prototypes
5	void display_Question()
6	void yes_No()
7	int get_Status()
8	
9	// start main function
10	int main() {
11	char red_zone, close_contact, fever;
12	// two possible character values only:
13	// 'y' -> yes, 'n' -> no
14	
15	int status;
16	// 0 -> GREEN, 1 -> YELLOW, 2 -> ORANGE, 3 -> RED
17	
18	for (int i = 1; i < 3; i++) {
19	display_question(i);
20	if (i = 1)
21	yes_No(red_zone);
22	// set red_zone either 'y' or 'n'
23	else if (i = 2)
24	yes_No(close_contact);
25	// set close_contact either 'y' or 'n'
26	else
27	yes_No(fever);
28	// set fever either 'y' or 'n'
29	}
30	
31	

```

32 // get risk status based on red_zone,
    close_contact, fever parameters
    status = get_Status(red_zone, close_contact,
33 fever);
34     cout << "Your Covid-19 risk status is ";
35     while (status) {
36         if status = 0: cout << "GREEN"; break;
37         if status = 1: cout << "YELLOW"; break;
38         if status = 2: cout << "ORANGE";
39         if status = 3: cout << "RED";
40     }
41     cout << "\n";
42     return 0;
43 }
44
45 // start new user-defined functions
46 void display_Question(char q) {
47     switch (q)
48     case 1:
49         cout << "Living in red zone?\n";
50         break;
51     case 2:
52         cout << "Have a close contact with
Covid-19 patient?\n";
53         break;
54     case 3:
55         cout << "Body temperature >= 38 degrees
Celcius?\n";
56     } return q;
57 }
58
59 void yes_No(char ans) {
60     do {
61         cout << "Please enter your answer (y / n): ";

```

62	cin << ans;
63	} while (ans = 'n' & ans = 'y');
64	cout << '\n';
65	}
66	
67	int get_Status(char rz, char cc, char f) {
68	int s = 0;
69	if (rz = 'y') s++;
70	if (cc = 'y') s++;
71	if (f = 'y') s++;
72	return s;
	}

Fill in the following table by stating the line number and write the correct statement with the reason(s).

Line Number	Correct Statement with the reason(s)
5	<code>void display_Question(char);</code>
6	<code>void yes_No(char);</code>
7	<code>int get_Status(char,char,char);</code>
19	<code>display_Question(i);</code>
36	<code>if (status = 0) cout << "GREEN"; break;</code>
37	<code>if (status = 1) cout << "YELLOW"; break;</code>
38	<code>if (status = 2) cout << "ORANGE";</code>
39	<code>if (status = 3) cout << "RED";</code>
47	<code>switch (q){</code>
56	<code>}</code>
62	<code>cin >> ans;</code>
63	<code>} while (ans != 'n' && ans != 'y');</code>

Line Number	Correct Statement with the reason(s)

Line Number	Correct Statement with the reason(s)

SET 2

Complete the code segments in the program below.

1. Task 1:

Write a function named **setType** with the parameter of car type variable, which prompts the user to enter a car type either "**sedan**" or "**mpv**" and continues to do so in a loop until the entered type is either "**sedan**" or "**mpv**".

2. Task 2:

Write a function named **setPackage** with the parameter of car wash service package, which displays a menu with three options for car wash service packages: **Basic (1)**, **Deluxe (2)**, and **Premium (3)**.

It prompts the user to choose a package by entering the corresponding number (1, 2, or 3). The loop continues until a valid package number (between 1 and 3 inclusive) is entered by the user.

3. Task 3:

Write a function named **wash** with the parameter of car type variable, which calculates the wash service charge based on the type of car.

If the car type is "**mpv**", the charge is calculated as **1.2 times** the constant **WASH**; otherwise, the charge is equal to the constant **WASH**.

The calculated charge is then displayed, and the function returns the computed charge.

4. Task 4:

Write a function named **vacuum** with the parameter of car type variable, which calculates the vacuum service charge based on the type of car.

If the car type is "**mpv**", the charge is calculated as **1.05 times** the constant **VACUUM**; otherwise, the charge is equal to the constant **VACUUM**.

The calculated charge is then displayed, and the function returns the computed charge.

5. Task 5:

Write a function named **polish** with the parameter of car type variable, which calculates the polish service charge based on the type of car.

If the car type is "**mpv**", the charge is calculated as **1.2 times** the constant **POLISH**; otherwise, the charge is equal to the constant **POLISH**.

The calculated charge is then displayed, and the function returns the computed charge.

6. Task 6:

List all function prototypes.

7. Task 7:

- (i) Call the functions from Task 1 until Task 5 in the **main** function.
- (ii) **totalCharge** is the variable to hold the total service charge based on different wash service package with different car type ("**sedan**" or "**mpv**").
(Note for wash service packages: Task 3 for **Basic**, Task 4 for **Deluxe**, and Task 5 for **Premium**)
- (iii) Print out the final total service charge.

8. Task 8:

You must ensure your program fulfil the following criteria:

- The program is able to run.
- The program uses an appropriate structure for the program (e.g. all required header files are included, the program is properly written, proper indentation, etc.).

Sample Execution Output

```
Enter car type (sedan/mpv): sedan
1. Basic
2. Deluxe
3. Premium
Choose wash service package (1/2/3): 1
Wash service charge is 10
Total service charge is 10
-----
```

```
Enter car type (sedan/mpv): sedan
1. Basic
2. Deluxe
3. Premium
Choose wash service package (1/2/3): 2
Vacuum service charge is 7
Total service charge is 7
-----
```

```
Enter car type (sedan/mpv): sedan
```

- 1. Basic
- 2. Deluxe
- 3. Premium

```
Choose wash service package (1/2/3): 3
```

```
Polish service charge is 15
```

```
Total service charge is 15
```

```
-----
```

```
Enter car type (sedan/mpv): mpv
```

- 1. Basic
- 2. Deluxe
- 3. Premium

```
Choose wash service package (1/2/3): 1
```

```
Wash service charge is 12
```

```
Total service charge is 12
```

```
-----
```

```
Enter car type (sedan/mpv): mpv
```

- 1. Basic
- 2. Deluxe
- 3. Premium

```
Choose wash service package (1/2/3): 2
```

```
Vacuum service charge is 7.35
```

```
Total service charge is 7.35
```

```
-----
```

```
Enter car type (sedan/mpv): mpv
```

- 1. Basic
- 2. Deluxe
- 3. Premium

```
Choose wash service package (1/2/3): 3
```

```
Polish service charge is 18
```

```
Total service charge is 18
```

```
-----
```

Note: show user's input.

```

#include <iostream>
#include <string>
using namespace std;

// constants with the associated values
#define WASH 10.0 // the price of WASH service charge
#define VACUUM 7.0 // the price of VACUUM service charge
#define POLISH 15.0 // the price of POLISH service charge

// Task 6: List all function prototypes.
void setType(string &);
void setPackage(int &);
double wash(string);
double vacuum(string);
double polish(string);

// Task 7: (i) Call the functions from Task 1 until Task 5.
int main() {
    string carType; // car type variable
    int wsPkg; // car wash service package
    float totalCharge = 0; // total service charge based on
different wash service package with different car type

    // call setType function with the parameter carType
    setType(carType);

    // call setPackage function with the parameter wsPkg
    setPackage(wsPkg);

```

```

        // Task 7: (ii) totalCharge is the variable to hold the
        total service charge based on different wash service package
        with different car type (sedan or mpv).
        switch (wsPkg) {
            case 1: totalCharge= wash(carType);
                    break;
            case 2: totalCharge= vacuum(carType);
                    break;
            case 3: totalCharge= polish(carType);
                    break;

        }

        cout << endl;
        cout << "Total service charge is " << totalCharge;
        return 0;
    }

// Task 1: Function to set car type
void setType(string &type) {
    cout<<"Enter car type (sedan/mpv): ";
    cin>>carType;
    while(carType!="sedan"||carType!="mpv") {
        cout<<"Invalid car type. Please enter again: ";
        cin>>carType;
    }
}

```

```

        cout << endl;
    }

// Task 2: Function to set wash service package
void setPackage(int &wsPkg) {
    cout<<"1. Basic"<<endl;
    cout<<"2. Deluxe"<<endl;
    cout<<"3. Premium"<<endl;
    cout<<"Choose wash service package (1/2/3): "<<endl;
    cin>>wsPkg;
    while(wsPkg!=1||wsPkg!=2||wsPkg!=3){
        cout<<"Invalid wash service package. Please enter
again: ";
        cin>>wsPkg;
    }

    cout << endl;
}

// Task 3: Function to determine exterior wash service charge
based on car type
float wash(string carType) {
    if(carType=="mpv")
        return 1.2*WASH;
}

```

```
        else
            return WASH;

    }

// Task 4: Function to determine interior vacuum service
charge based on car type
float vacuum(string type) {
    if(carType=="mpv")
        return 1.05*VACUUM;
    else
        return VACUUM;

}

// Task 5: Function to determine exterior polish service
charge based on car type
float polish(string type) {
    if(carType=="mpv")
        return 1.2*POLISH;
    else
        return POLISH;
```

```
}
```