

(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).

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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() <sup>char</sup>
6	void yes_No() <sup>char</sup>
7	int get_Status() <sup>char, char &amp;, char &amp;</sup>
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(intchar 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"; break;
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 ( int ) ;</code> // no data type and semicolon .
6.	<code>void yes_No ( char &amp; ) ;</code> // no data type and semicolon .
7.	<code>int get_Status ( char &amp; , char &amp; , char &amp; ) ;</code> // no data type and semicolon
18.	<code>for ( int i = 1 ; i &lt;= 3 ; i++ ) {</code> // i is not equal to 3 so that the question 3 Body temperature >= 38 degrees Celcius ? does not display .
19.	<code>display_Question ( i ) ;</code> // call function must same with prototype and header
20.	<code>if ( i == 1 )</code> // it assign i = 1 and it's not checking condition.
23.	<code>if ( i == 2 )</code> // it assign i = 2 and it's not checking whether i is 2 or not .
35.	// I use if statement no switch
36.	<code>if ( status == 0 ) cout &lt;&lt; "GREEN" ;</code> // it checking whether the status is 0 or not . not assign status = 0 .
37.	<code>if ( status == 1 ) cout &lt;&lt; "YELLOW" ;</code> // it assign status = 1 and not checking whether status is 1 or not .
38.	<code>if ( status == 2 ) cout &lt;&lt; "ORANGE" ;</code> // it assign status = 2 and not checking whether status is 2 or not .
39.	<code>if ( status == 3 ) cout &lt;&lt; "RED" ;</code> // it assign status = 3 and not checking whether status is 3 or not .
40.	// no curly bracket need
46.	<code>void display_Question ( int q ) {</code> // the data type is integer
47.	<code>switch ( q ) {</code> // no curly bracket

Line Number	Correct Statement with the reason(s)
55.	cout << "Body temperature >= 38 degrees celcius? \n"
56.	break; // no break
57.	} // void no need return
59	void yes_No (char& ans) // reference variable .
62.	cin >> ans; // wrong symbol for cin
63.	{ while (ans != 'n' && ans != 'y'); // it will continuous the loop until the user have enter the specific input.
64.	cout << "\n"; // it double quote not single quote
67.	int get_status (char& rz, char& cc, char& f) { //
69.	if (rz == 'y') s++ ; // it assign rz = y not checking <sup>reference variable.</sup>
70.	if (cc == 'y') s++ ; // it assign cc = y not checking
71.	if (f == 'y') s++ ; // it assign f = y not checking

## 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
```

```
-----
```



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.

```
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 &);
float wash (string);
float vacuum (string);
float 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) {
```

```
    do {
```

```
        cout << "Enter car type (sedan/mpv): ";
```

```
        cin >> type;
```

```
    } while (type != "sedan" && type != "mpv");
```

```
    cout << endl;
```

```
}
```

```

// Task 2: Function to set wash service package
void setPackage(int &pkg) {
    do {
        cout << "1. Basic\n" ;
        cout << "2. Deluxe\n" ;
        cout << "3. Premium\n" ;
        cout << "Choose wash service package (1/2/3): ";
        cin >> pkg;
    } while (pkg != 1 && pkg != 2 && pkg != 3);

    cout << endl;
}

// Task 3: Function to determine exterior wash service charge
based on car type
float wash(string type) {
    float rate ;
    if ( type == "sedan" )
        rate = 1 ;
    else
        rate = 1.2;

    cout << "Wash service charge is " << WASH*rate << endl;
    return WASH*rate ;
}

// Task 4: Function to determine interior vacuum service
charge based on car type
float vacuum(string type) {

```

```

float charge;
if(type == "sedan")
    charge = 1;
else
    charge = 1.05;
cout << "Vacuum service charge is " << VACUUM*charge<<endl;
return VACUUM*charge;
}

```

// Task 5: Function to determine exterior polish service charge based on car type

```

float polish(string type) {
    float rate;
    if (type == "sedan")
        rate = 1;
    else
        rate = 1.2;
    cout << "Polish service charge is " << POLISH*rate<<endl;
    return POLISH*rate;
}

```