NAME : _____
STUDENT NO. : _____
GROUP : _____

LESSON 1: INTRODUCTION TO SELECTION STRUCTURE

Selection structure allows instructions to be executed **non-sequentially** based on selected **conditions** formed by the **Boolean expression**. The condition will be tested and based on the input data; certain course of action is selected.

There are THREE (3) types of selection structure:

(i) One-way selection
(ii) Two-way selection
(iii) Multiple way selection

C++ has two (2) selections structure:

(i) `if`
(ii) `switch`

BOOLEAN EXPRESSION

- Boolean expression is an expression that results in a **Boolean value** non-zero or 0 (**TRUE** or **FALSE**).
- A Boolean expression may contain variables, constant, functions, arithmetic operators and relational operators.
- A more complex expression can be created using the **logical operators**.

Relational Operatiors

Operatior	Operations	Example
<	Less than	a<b
>	Greater than	a>b
<=	Less than or equal to	a<=b
>=	Greater than equal to	a>=b
=	Equal to	a==b
!=	Not equal to	a!=b

Table 1: Relational operators in C++

Logical Operators		
Operator	Description	Example
&&	AND	x=6 y=3 x<10 && y>1 Return True
||	OR	x=6 y=3 x==5 || y==5 Return False
!	NOT	x=6 y=3 !(x==y) Return True

Table 2: Logical operators in C++

QUESTION 1

Give the meaning of the following simple Boolean expression:

Example: 3 < 7 → 3 is less than 7.

Boolean Expression	Meaning
19 < 36	
9 != 9	
4.6 > 9.9	
9.6 <= 98.5	
25 == 25	

QUESTION 2

Give the value TRUE or FALSE for the following simple Boolean expressions:

Assume that i = 14 and j = 26.

Boolean Expression	Meaning
12 == 13	
i == 14	
j >= 25	
j != i	
i < j + 2	

QUESTION 3

Give the value TRUE or FALSE for the following compound Boolean expressions:

Assume that a = 5, b = 6 and c = 7.

Boolean Expression	Meaning
a < b && c > b	
a <= c && a > 0	
a >= b || c == 3	

LESSON 2: ONE-WAY SELECTION (USING IF)

An action following the `if` statement is executed if the condition is `true`, otherwise the control goes to the next statement outside the `if` statement.

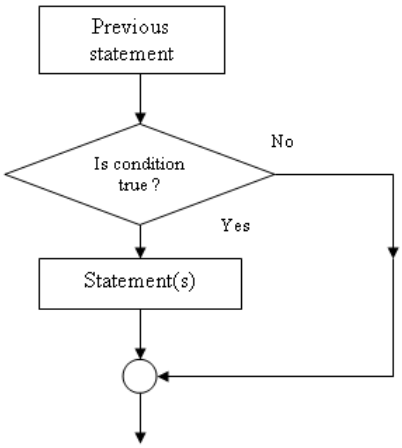

Figure 1: Flowchart of one-way selection

```
syntax :
        if ( <conditional expression / logical statement>)
        {
            // statements to be executed when logical statement is satisfied
            // i.e. when the logical statement yields a true value
        }
```

Figure 2: Syntax of one-way selection in C++

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

int main()
{
	float marks;
	cout<<"Please enter your marks: ";
	cin>>marks;

	if (marks >= 50)
		cout<<"\nYou have passed."<<endl;

	cout<<"\nEnjoy your day"<<endl;
}
```

Code 1: Example of one-way selection in C++

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

int main()
{
	float marks;
	cout<<"Please enter your marks: ";
	cin>>marks;

	if (marks >= 50)
	{
		cout<<"\nCongratulations."<<endl;
		cout<<"You have passed."<<endl;
		cout<<"You do NOT have to repeat the same code."<<endl;
	}
```

```
        cout<<"\nEnjoy your day"<<endl;
}
```

Code 2: Example of one-way selection with compound statements in C++

QUESTION 1

Kurnia Sdn. Bhd. has decided to increase the staff salary and attendance allowance by 12% and 5% respectively if the salary is less than RM1, 500.

Write a program in C++ that can determine whether the salary input is less than RM1, 500 or not. If it is, the staff salary and the attendance allowance will be updated by 12% and 5% respectively.

QUESTION 2

Draw the flowchart of Question 1.

LESSON 3: TWO-WAY SELECTION (USING IF)

An action (or set of actions) is taken if the condition is true, another action (or set of actions) is taken if the condition is false, then the control goes to the next statement.

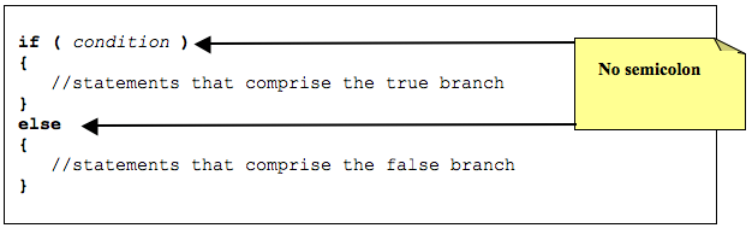

Figure 3: Syntax form of two-way selection in C++

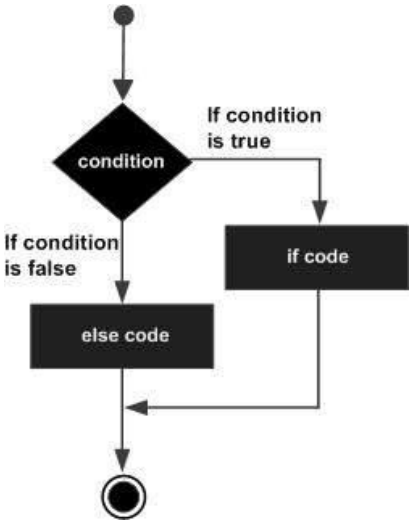

Figure 4: Flowchart of two-way selection

QUESTION 1

Suppose a magazine costs RM5 each if at least 5 units of magazines are purchased and RM7 each otherwise. Calculate the price a customer must pay after he enters the quantity of the magazines.

QUESTION 2

Draw the flowchart of Question 1.

QUESTION 3

A company wants you to develop a program in C++ which helps up in calculating the bonus of its employees. The bonus will be calculated based on the performance mark of the employee. Your program should be able to receive performance mark from the user and display the bonus to the user as well. The table for the bonus is provided as follows:

Performance mark	Bonus (RM)
6 to 10	2500
Below 6	1200

QUESTION 4

(a) Write a program in C++ that is able to find the smallest number between two numbers.
(b) Write a program in C++ that is able to find the largest number between two numbers.