

SUBMISSION

A. Multiple-choice questions (5.0 marks)

A.1. Which of the following operators has the highest precedence?

Answer: D. Logical Not

Giải thích: Bởi vì người ta quy định nó như vậy

According to: https://chortle.ccsu.edu/Java5/Notes/chap40/ch40_16.html

A.2. In an IF-statement, which of the following expressions correctly determines that x is greater than 10 and less than 20?

Answer: C

A, B => Expression error

D: Logic error

E: Because C is right, then “None of the above” is wrong.

A.3. Which of the following statements will cause a logic error if you are trying to compare x to 5?

Answer: B

Phép “=” là phép gán, không phải phép so sánh

A.4. What is the result of the following code fragment?

Answer: E

Vì x = 0 nên màn hình in “Zero”, và không có break nên in luôn “Hello World”.

A.5. Which type of expression CANNOT be checked by a SWITCH statement?

Answer: B

Bởi vì người ta quy định nó như vậy,

According to: <https://www.geeksforgeeks.org/switch-statement-cc/>

B. Essay Questions (5 marks)

B.1. Consider the following statement

```
int y = !(3 > x && 3 <= 5 || 12 < 5) ? 7 : 9;
```

If x = 2, how many comparisons will be made to determine the value of y? Briefly describe each comparison

Answer: There are three comparisons which were made, they are:

1. $3 > x$
2. $3 \leq 5$
3. Kiểm tra xem biểu thức ở giữa hai cặp dấu "(" ")" có bằng true hay không.

B.2. The three following code fragments look similar, but are their outputs the same? If not, explain why. Which fragment has poor coding style?

Answer: Their output are the same.

First code:

```
int x = 20;
if (x > 15)
if (x < 17)
    cout << "BLUE";
else
    cout << "GREEN";
cout << "JEANS";

// Line 2 should be: if(x > 15 && x < 17)
// Output: GREENJEANS
```

The second one:

```
int x = 12;
if (x > 12)
if (x < 15)
    cout << "BLUE";
else
    cout << "GREEN";
cout << "JEANS";
// Line 2 should be: if(x > 12 && x < 15)
// The overall code should be tabbed carefully like this:
int x = 12;
if (x > 12 && x < 15)
    cout << "BLUE";
else
    cout << "GREEN";
cout << "JEANS";
// Expect output: GREENJEANS
```

The third one:

```
int x = 12;
if (x > 12)
{
    if (x < 15) cout << "BLUE";
}
else
```

```
cout << "GREEN";  
cout << ("JEANS");  
// The last line should be: cout << "JEAN"; the brackets () is not  
necessary  
  
//Expect output: GREENJEANS
```

B.3. The below code fragment contains some problems that potentially cause syntax/semantic/logic errors. Point out the errors and suggest how to fix them

```
if numNeighbors >= 3 || numNeighbors = 4  
    ++numNeighbors;  
cout << "You are dead!";  
else  
    --numNeighbors;
```

Errors:

Line 1: missing "(" , ")". It should be: (numNeighbors >= 3 || numNeighbors = 4)

Line 2, 3: missing "{" , "}". It should be:

```
{  
    ++numNeighbors;  
    cout << "You are dead!";  
}
```

B.4. Is it always possible to convert an if-then statement to a switch-case statement? And vice versa? Give your reasons

Is it always possible to convert an if-then statement to a switch-case statement?: **No**

And vice versa?: **Yes**

Reason (Lý do):

- Không thể chuyển từ if-then với điều kiện là số thực sang switch-case, ví dụ (**từ code dưới sang switch case là không thể**):

```
if(a > 4.5 && a < 9.22) {  
    // do something  
}
```

- Ngược lại thì có thể, từ công thức so sánh của switch-case chuyển sang if-then theo đúng cú pháp của từng hàm tương ứng như cú pháp dưới link bên dưới:

https://vietjack.com/cplusplus/lenh_switch_trong_cplusplus.jsp

B.5. Consider the following code fragment. Assume that the variables `doesSignificantWork`, `makesBreakthrough`, and `nobelPrizeCandidate` are all of `bool` type. It is possible to improve the above code fragment by using fewer `if` statement(s): **Yes**

This is How:

```
if (doesSignificantWork){
    if (makesBreakthrough)
        nobelPrizeCandidate = true;
    else
        nobelPrizeCandidate = false;
}
else // (1)

    nobelPrizeCandidate = false;

// In (1), I removed "if (!doesSignificantWork)"
```

Moreover, the code fragment can also be rewritten using only a single statement.

This is How:

```
nobelPrizeCandidate = doesSignificantWork && makesBreakthrough;
```