



Lesson Plan

Conditionals

Topics to be covered:

- If statement
- If-else statement
- Nested if-else statement
- Conditional operators
- Switch statement

If statement

An if statement is the most common conditional statement. It executes when the condition being checked evaluates to true.

Syntax:

```
if(condition) {
//statements
}
Example:
if(x > 20) {
cout << "Value of x is greater than 20\n";
}
```

Output:

CASE 1: Let value of x be 30
Value of x is greater than 20

CASE 2: Let value of x be 10
No output in this case

If-else statement

An if-else statement is designed to give us this functionality in our code. It executes statements if some condition is true or false. If the condition is true, the if part is executed, otherwise the else part of the statement is executed.

Syntax:

```
if(condition) {
//statements
} else {
// statements
}
Example:
if(x > 20) {
cout << "Value of x is greater than 20\n";
} else {
cout << "Value of x is less than 20"
}
```

Output:

CASE 1: Let value of x be 30

Value of x is greater than 20

CASE 2: Let value of x be 10

Value of x is less than 20

Nested if-else

It is simply an if-else statement inside another if-else statement.

Syntax:

```
if (condition - 1)
{
if (condition - 2)
{
//statements
}
else
{
//statements
}
}
else
{
//statements
}
```

Example:

```
cout << "Value of x is "
if (x > 20)
{
if(x > 100)
{
cout << "very much";
}
cout << "greater\n";
}
else
{
cout << "smaller\n";
}
```

Output:

CASE 1: Let value of x be 150

Value of x is very much greater than 20

CASE 2: Let value of x be 50

Value of x is greater than 20

CASE 3: Let value of x be 10

Value of x is less than 20

Conditional operators

These operators are used when a condition comprises of more than one Boolean expression/ condition check.

We have following types of conditional operators - logical-and, logical-or and ternary operator.

Syntax:

```
if(condition - 1 || condition - 2)
{
    statement;
}
```

Example:

```
if (val < 10 || val > 20)
{
    cout << "Value is either greater than 20 or less than 10."
}
```

Case 1: val = 3

Output: Value is either greater than 20 or less than 10.

Case 2: val = 40

Output: Value is either greater than 20 or less than 10.

Case 3: val = 11

Output: No output

Ternary operator (?:) : It is a smaller version for the if-else statement. If the condition is true then statement - 1 is executed else the statement - 2 is executed.

Syntax: condition ? statement - 1 : statement - 2;

Example:

```
//Without ternary operator
if (val == 10)
{
cout << "The current value is 10\n";
}
else
{
cout << "The current value is not 10\n";
}

//With ternary operator
val = 10 ? cout << "The current value is 10\n" : cout << "The
current value is
not 10\n";
```

Case 1: val = 10

Output: The current value is 10

Case 2: val = 20

Output: The current value is not 10

NOTE: “and” can also be written instead of “&&” and “or” can also be written as “||”.

Switch statement

Switch Statement is like an if-else ladder with multiple conditions, where we check for equality of a variable with different values.

Syntax:

```
switch (expression)
{
case x:
// code
break;
case y:
// code
break;
.
.
.
default:
// code
}
```

Example:

```
switch (ch) {
case 'a':
cout << "Vowel\n";
break;
case 'e':
cout << "Vowel\n";
break;
case 'i':
cout << "Vowel\n";
break;
case 'o':
cout << "Vowel\n";
break;
case 'u':
cout << "Vowel\n";
break;
default:
cout << "Consonant\n";
}
```

Output:

Case 1: ch = 'a'

Output: Vowel

Case 2: ch = 'x'

Output: Consonant

Q1. Take positive integer input and tell if it is even or odd

```
#include <iostream>

int main() {
    int number;

    // Input a positive integer
    std::cout << "Enter a positive integer: ";
    std::cin >> number;

    // Check if the input is positive
    if (number > 0) {
        // Check if the input is even or odd
        if (number % 2 == 0) {
            std::cout << number << " is even." << std::endl;
        } else {
```

```

        std::cout << number << " is odd." << std::endl;
    }
} else {
    std::cout << "Please enter a positive integer." <<
std::endl;
}

return 0;
}

```

Q2. Take positive integer input and tell if it is divisible by 5 or not.

```

#include <iostream>

int main() {
    int number;

    // Input a positive integer
    std::cout << "Enter a positive integer: ";
    std::cin >> number;

    // Check if the input is positive
    if (number > 0) {
        // Check if the input is divisible by 5
        if (number % 5 == 0) {
            std::cout << number << " is divisible by 5." <<
std::endl;
        } else {
            std::cout << number << " is not divisible by 5." <<
std::endl;
        }
    } else {
        std::cout << "Please enter a positive integer." <<
std::endl;
    }

    return 0;
}

```

Q3. Given an integer. Print the absolute value of that integer.

```

#include <iostream>

int main() {
    int number;

```

```

// Input an integer
std::cout << "Enter an integer: ";
std::cin >> number;

// Calculate and print the absolute value
int absoluteValue = (number < 0) ? -number : number;
std::cout << "The absolute value of " << number << " is: " <<
absoluteValue << std::endl;

return 0;
}

```

Q4. If cost price and selling price of an item is input through the keyboard, write a program to determine whether the seller has made profit or incurred loss. Also determine how much profit he made or loss he incurred.

```

#include <iostream>

int main() {
    float costPrice, sellingPrice;

    // Input cost price and selling price
    std::cout << "Enter the cost price: ";
    std::cin >> costPrice;

    std::cout << "Enter the selling price: ";
    std::cin >> sellingPrice;

    // Determine profit or loss and calculate the amount
    float profitOrLoss = sellingPrice - costPrice;

    if (profitOrLoss > 0) {
        std::cout << "Profit of " << profitOrLoss << " units." <<
        std::endl;
    } else if (profitOrLoss < 0) {
        std::cout << "Loss of " << -profitOrLoss << " units." <<
        std::endl;
    } else {
        std::cout << "No profit, no loss." << std::endl;
    }

    return 0;
}

```

Q5. Take positive integer input and tell if it is a three digit number or not.

```
#include <iostream>

int main() {
    int number;

    // Input a positive integer
    std::cout << "Enter a positive integer: ";
    std::cin >> number;

    // Check if the input is positive and a three-digit number
    if (number > 0 && number ≥ 100 && number ≤ 999) {
        std::cout << number << " is a three-digit number." <<
    std::endl;
    } else {
        std::cout << number << " is not a three-digit number." <<
    std::endl;
    }

    return 0;
}
```

Q6. Take positive integer input and tell if it is divisible by 5 and 3.

```
#include <iostream>

int main() {
    int number;

    // Input a positive integer
    std::cout << "Enter a positive integer: ";
    std::cin >> number;

    // Check if the input is positive and divisible by both 5 and
3
    if (number > 0 && number % 5 == 0 && number % 3 == 0) {
        std::cout << number << " is divisible by both 5 and 3."
<< std::endl;
    } else {
        std::cout << number << " is not divisible by both 5 and
3." << std::endl;
    }

    return 0;
}
```

Q7. Take positive integer input and tell if it is divisible by 5 or 3.

```
#include <iostream>

int main() {
    int number;

    // Input a positive integer
    std::cout << "Enter a positive integer: ";
    std::cin >> number;

    // Check if the input is positive and divisible by either 5
    or 3
    if (number > 0 && (number % 5 == 0 || number % 3 == 0)) {
        std::cout << number << " is divisible by either 5 or 3."
    << std::endl;
    } else {
        std::cout << number << " is not divisible by either 5 or
    3." << std::endl;
    }

    return 0;
}
```

Q8. Take 3 positive integers input and print the greatest of them.

```
#include <iostream>

int main() {
    int num1, num2, num3;

    // Input three positive integers
    std::cout << "Enter the first positive integer: ";
    std::cin >> num1;

    std::cout << "Enter the second positive integer: ";
    std::cin >> num2;

    std::cout << "Enter the third positive integer: ";
    std::cin >> num3;

    // Check if the inputs are positive and determine the
    greatest
    if (num1 > 0 && num2 > 0 && num3 > 0) {
        int greatest = (num1 > num2) ? (num1 > num3 ? num1 :
    num3) : (num2 > num3 ? num2 : num3);
        std::cout << "The greatest number is: " << greatest <<
    std::endl;
    } else {
```

```

        std::cout << "Please enter positive integers." <<
std::endl;
    }

    return 0;
}

```

Q9. Write a program to check whether a character is an alphabet or not.

```

#include <iostream>

int main() {
    char character;

    // Input a character
    std::cout << "Enter a character: ";
    std::cin >> character;

    // Check if the character is an alphabet
    if ((character >= 'a' && character <= 'z') || (character >=
'A' && character <= 'Z')) {
        std::cout << character << " is an alphabet." <<
std::endl;
    } else {
        std::cout << character << " is not an alphabet." <<
std::endl;
    }

    return 0;
}

```

Q10. Take positive integer input and tell if it is divisible by 5 or 3 but not divisible by 15.

```

#include <iostream>

int main() {
    int number;

    // Input a positive integer
    std::cout << "Enter a positive integer: ";
    std::cin >> number;

    // Check if the input is positive and divisible by either 5
    // or 3 but not by 15
    if (number > 0 && (number % 5 == 0) && (number % 3 == 0)) {

```

```

        std::cout << number << " is divisible by either 5 or 3
but not by 15." << std::endl;
    } else {
        std::cout << number << " is not divisible by either 5 or
3 or is divisible by 15." << std::endl;
    }

    return 0;
}

```

Q11. Take input percentage of a student and print the Grade according to marks:

- 1. 91-100 Excellent**
- 2. 81-90 Very Good**
- 3. 71-80 Good**
- 4. 61-70 Can do better**
- 5. 51-60 Average**
- 6. 40-50 Below Average**
- 7. <40 Fail**

```

#include <iostream>

int main() {
    double percentage;

    // Input the percentage
    std::cout << "Enter the percentage of the student: ";
    std::cin >> percentage;

    // Determine the grade based on the percentage
    if (percentage ≥ 91 && percentage ≤ 100) {
        std::cout << "Grade: Excellent" << std::endl;
    } else if (percentage ≥ 81 && percentage ≤ 90) {
        std::cout << "Grade: Very Good" << std::endl;
    } else if (percentage ≥ 71 && percentage ≤ 80) {
        std::cout << "Grade: Good" << std::endl;
    } else if (percentage ≥ 61 && percentage ≤ 70) {
        std::cout << "Grade: Can do better" << std::endl;
    } else if (percentage ≥ 51 && percentage ≤ 60) {
        std::cout << "Grade: Average" << std::endl;
    } else if (percentage ≥ 40 && percentage ≤ 50) {
        std::cout << "Grade: Below Average" << std::endl;
    } else if (percentage < 40) {
        std::cout << "Grade: Fail" << std::endl;
    } else {

```

```

        std::cout << "Invalid percentage entered." << std::endl;
    }

    return 0;
}

```

Q12. Write a program to check whether a given character is a vowel or a consonant.

```

#include <iostream>

int main() {
    char character;

    // Input a character
    std::cout << "Enter a character: ";
    std::cin >> character;

    // Convert the character to lowercase for simplicity
    char lowercaseChar = tolower(character);

    // Check if the character is a vowel or a consonant
    if (lowercaseChar >= 'a' && lowercaseChar <= 'z') {
        if (lowercaseChar == 'a' || lowercaseChar == 'e' ||
lowercaseChar == 'i' || lowercaseChar == 'o' || lowercaseChar ==
'u') {
            std::cout << character << " is a vowel." <<
std::endl;
        } else {
            std::cout << character << " is a consonant." <<
std::endl;
        }
    } else {
        std::cout << character << " is not a valid alphabet
character." << std::endl;
    }

    return 0;
}

```

Q13. Take 3 numbers input and tell if they can be the sides of a triangle.

```

#include <iostream>

int main() {
    double side1, side2, side3;

```

```

// Input three numbers
std::cout << "Enter the length of side 1: ";
std::cin >> side1;

std::cout << "Enter the length of side 2: ";
std::cin >> side2;

std::cout << "Enter the length of side 3: ";
std::cin >> side3;

// Check if the numbers can be sides of a triangle
if (side1 + side2 > side3 && side2 + side3 > side1 && side3 + side1 > side2) {
    std::cout << "These lengths can form the sides of a triangle." << std::endl;
} else {
    std::cout << "These lengths cannot form the sides of a triangle." << std::endl;
}

return 0;
}

```

Q14. Given the marks of the student. If the marks are greater than 33 print the result as pass otherwise fail without using if-else statement.

```

#include <iostream>

int main() {
    int marks;

    // Input the marks
    std::cout << "Enter the marks: ";
    std::cin >> marks;

    // Check and print the result without using if-else
    std::cout << "Result: " << ((marks > 33) ? "Pass" : "Fail")
    << std::endl;

    return 0;
}

```

Q15. Write a program to input week number(1-7) and print day of week name using switch case.

```
#include <iostream>

int main() {
    int weekNumber;

    // Input week number
    std::cout << "Enter the week number (1-7): ";
    std::cin >> weekNumber;

    // Print day of the week using switch-case
    switch (weekNumber) {
        case 1:
            std::cout << "Monday" << std::endl;
            break;
        case 2:
            std::cout << "Tuesday" << std::endl;
            break;
        case 3:
            std::cout << "Wednesday" << std::endl;
            break;
        case 4:
            std::cout << "Thursday" << std::endl;
            break;
        case 5:
            std::cout << "Friday" << std::endl;
            break;
        case 6:
            std::cout << "Saturday" << std::endl;
            break;
        case 7:
            std::cout << "Sunday" << std::endl;
            break;
        default:
            std::cout << "Invalid week number. Please enter a
number between 1 and 7." << std::endl;
    }

    return 0;
}
```

Q16. Write a program to input month number and print total number of days in month using switch case.

```
#include <iostream>

int main() {
    int monthNumber;

    // Input month number
    std::cout << "Enter the month number (1-12): ";
    std::cin >> monthNumber;
```

```

// Print total number of days in the month using switch-case
switch (monthNumber) {
    case 1: case 3: case 5: case 7: case 8: case 10: case 12:
        std::cout << "Total number of days in the month: 31"
<< std::endl;
        break;
    case 4: case 6: case 9: case 11:
        std::cout << "Total number of days in the month: 30"
<< std::endl;
        break;
    case 2:
        std::cout << "Total number of days in the month: 28
or 29 (leap year)" << std::endl;
        break;
    default:
        std::cout << "Invalid month number. Please enter a
number between 1 and 12." << std::endl;
}

return 0;
}

```

Q17. Write a program to create a calculator that performs basic arithmetic operations (add, subtract, multiply and divide) using switch case and functions. The calculator should input two numbers and an operator from user.

```

#include <iostream>

// Function to perform addition
double add(double num1, double num2) {
    return num1 + num2;
}

// Function to perform subtraction
double subtract(double num1, double num2) {
    return num1 - num2;
}

// Function to perform multiplication
double multiply(double num1, double num2) {
    return num1 * num2;
}

// Function to perform division
double divide(double num1, double num2) {
    // Check for division by zero
    if ≠ {
        return num1 / num2;
    }
}

```

```

    } else {
        std::cout << "Error: Division by zero is not allowed." <<
std::endl;
        return 0.0; // Returning 0 in case of division by zero
    }
}

int main() {
    double num1, num2;
    char operation;

    // Input two numbers and an operator
    std::cout << "Enter the first number: ";
    std::cin >> num1;

    std::cout << "Enter the second number: ";
    std::cin >> num2;

    std::cout << "Enter the operator (+, -, *, /): ";
    std::cin >> operation;

    // Perform the operation using switch-case
    double result;
    switch (operation) {
        case '+':
            result = add(num1, num2);
            break;
        case '-':
            result = subtract(num1, num2);
            break;
        case '*':
            result = multiply(num1, num2);
            break;
        case '/':
            result = divide(num1, num2);
            break;
        default:
            std::cout << "Invalid operator. Please enter a valid
operator." << std::endl;
            return 1; // Return with an error code
    }

    // Print the result
    std::cout << "Result: " << result << std::endl;

    return 0;
}

```



**THANK
YOU!**