**Programming for Problem Solving**

**WEEK-5**

**LONG DESCRIPTIVE QUESTION**

**1, Explain looping statements in detail with an example?**

Looping statements in programming are used to execute a block of code repeatedly based on a specified condition. They are essential for automating repetitive tasks. In C programming, there are three main types of looping statements: for, while, and do-while.

**For Loop**

The for loop is used when you know in advance how many times you want to execute a block of code.

for (initialization; condition; increment/decrement) {

// Code to be executed

}

Example: Output:

#include <stdio.h> Iteration 1

int main() { Iteration 2

int i; Iteration 3

for (i = 1; i <= 5; i++) { Iteration 4

printf("Iteration %d\n", i); Iteration 5

}

return 0;

}

**While Loop**

The while loop is used when you want to execute a block of code as long as a certain condition is true.

Its syntax is as follows:

while (condition) {

// Code to be executed

}

Example Output

#include <stdio.h> Iteration 1

int main() { Iteration 2

int i = 1; Iteration 3

while (i <= 5) { Iteration 4

printf("Iteration %d\n", i); Iteration 5

i++;

}

return 0;

}

**Do-While Loop:**

The do-while loop is used when you want to execute a block of code at least once, and then repeatedly as long as a certain condition is true.

Its syntax is as follows:

do {

// Code to be executed

} while (condition);

Example output

#include <stdio.h> Iteration 1

int main() { Iteration 2

int i = 1; Iteration 3

do { Iteration 4

printf("Iteration %d\n", i); Iteration 5

i++;

} while (i <= 5);

return 0;

}

**2, Differentiate between while and Do-while**

|  |  |  |
| --- | --- | --- |
|  | **While Loop** | **Do-while** |
| **Condition Check** | In a while loop, the condition is checked before entering the loop body. If the condition is false initially, the loop body will not execute at all. | In a do-while loop, the loop body is executed at least once before checking the condition. This guarantees that the loop body will execute at least once. |
| **Usage** | While loops are typically used when you want to execute a block of code zero or more times, based on a condition. | Do-while loops are used when you want to execute a block of code at least once and then repeatedly as long as a certain condition is true. |
| **Example** | while (condition) {  // Code to be executed  } | do {  // Code to be executed  } while (condition); |
| **Execution Flow** | If the condition is false from the beginning, the loop body will never execute. | The loop body is executed at least once, even if the condition is false initially. The condition is checked after the first execution |

**3, Write a syntax for if –else loop with an example**

Syntax for an if-else

**Syntax**

if (condition) {

// Code to be executed if the condition is true

} else {

// Code to be executed if the condition is false

}

Example:

#include <stdio.h>

int main() {

int number;

printf("Enter an integer: ");

scanf("%d", &number);

if (number % 2 == 0) {

printf("%d is even.\n", number);

} else {

printf("%d is odd.\n", number);

}

return 0;

}

In this example, the program takes an integer input from the user and uses an if-else statement to check whether the input number is even or odd. If the condition (number % 2 == 0) is true, it prints that the number is even; otherwise, it prints that the number is odd.

**5, Explain selection statements in detail with an example?**

Selection statements in programming are used to make decisions and execute different blocks of code based on whether a certain condition is true or false. In C programming, there are two primary selection statements: if and switch**.**

**If Statement**

The if statement is the most basic selection statement. It allows you to execute a block of code if a specified condition is true.

Syntax

if (condition) {

// Code to be executed if the condition is true

}

Example

#include <stdio.h>

int main() {

int age;

printf("Enter your age: ");

scanf("%d", &age);

if (age >= 18) {

printf("You are eligible to vote.\n");

} else {

printf("You are not eligible to vote.\n");

}

return 0;

}

In this example, the program checks if the age is greater than or equal to 18. If it is, it prints that the person is eligible to vote; otherwise, it prints that they are not eligible.

**Switch Statement**

The switch statement is used when you want to select one of several code blocks to execute based on the value of an expression.

Syntax

switch (expression) {

case value1:

// Code to be executed if expression matches value1

break;

case value2:

// Code to be executed if expression matches value2

break;

// More cases...

default:

// Code to be executed if expression doesn't match any case

}

Example

#include <stdio.h>

int main() {

int choice;

printf("Choose an option (1-3): ");

scanf("%d", &choice);

switch (choice) {

case 1:

printf("You selected option 1.\n");

break;

case 2:

printf("You selected option 2.\n");

break;

case 3:

printf("You selected option 3.\n");

break;

default:

printf("Invalid choice.\n");

}

return 0;

}

In this example, the program uses a switch statement to execute different code blocks based on the value of the choice variable.