
1- Trace the following program and predict the output.

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    int num1 = 5, num2 = 7, sum;
    sum = num1 + num2;
    printf("Sum: %d\n", sum);
    return 0;
}
```

Solution

```
Sum: 12
```

2- Trace the following program and predict the output.

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    int num = 9;
    if (num % 2 == 0) {
        printf("Even\n");
    } else {
        printf("Odd\n");
    }
    return 0;
}
```

Solution

```
Odd
```

3- Trace the following program and predict the output.

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    int num1 = 8, num2 = 12, num3 = 5;
    int largest = (num1 > num2) ? ((num1 > num3) ? num1 : num3) : ((num2 > num3) ? num2 : num3);
    printf("Largest: %d\n", largest);
    return 0;
}
```

Solution

```
Largest: 12
```

4- Trace the following program and predict the output.

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    char operator = '+';
    int num1 = 10, num2 = 5, result;
    switch (operator) {
        case '+':
            result = num1 + num2;
            break;
        case '-':
            result = num1 - num2;
            break;
        case '*':
            result = num1 * num2;
            break;
        case '/':
            result = num1 / num2;
            break;
        default:
            printf("Invalid operator\n");
            return 1;
    }
    printf("Result: %d\n", result);
    return 0;
}
```

Solution

```
Result: 15
```

5- Trace the following program and predict the output.

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    int n = 10, first = 0, second = 1, next;
    printf("Fibonacci Series: ");
    for (int i = 0; i < n; ++i) {
        printf("%d, ", first);
        next = first + second;
        first = second;
        second = next;
    }
    printf("\n");
    return 0;
}
```

Solution

```
Fibonacci Series: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34,
```

6- Trace the following program and predict the output.

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    int year = 2024;
    if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0)) {
        printf("%d is a Leap Year\n", year);
    } else {
        printf("%d is not a Leap Year\n", year);
    }
    return 0;
}
```

Solution

```
2024 is a Leap Year
```

7- Trace the following program and predict the output.

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    int num = 12345, reversed = 0, remainder;
    while (num != 0) {
        remainder = num % 10;
        reversed = reversed * 10 + remainder;
        num /= 10;
    }
    printf("Reversed Number: %d\n", reversed);
    return 0;
}
```

Solution

```
Reversed Number: 54321
```

8- Trace the following program and predict the output.

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    int n = 5, sum = 0;
    for (int i = 1; i <= n; ++i) {
        sum += i;
    }
    printf("Sum of first %d natural numbers: %d\n", n, sum);
    return 0;
}
```

Solution

```
Sum of first 5 natural numbers: 15
```

9- Trace the following program and predict the output.

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    int num = 9876, count = 0;
    while (num != 0) {
        num /= 10;
        ++count;
    }
    printf("Number of digits: %d\n", count);
    return 0;
}
```

Solution

```
Number of digits: 4
```

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10 - Trace the following program and predict the output.

```c
// www.gammal.tech

#include <stdio.h>

int main() {
    int num1 = 5, num2 = 10, temp;
    printf("Before swapping: num1 = %d, num2 = %d\n", num1, num2);
    temp = num1;
    num1 = num2;
    num2 = temp;
    printf("After swapping: num1 = %d, num2 = %d\n", num1, num2);
    return 0;
}
```

Solution

```
Before swapping: num1 = 5, num2 = 10
After swapping: num1 = 10, num2 = 5
```