Input and Output

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I/O Functions

printf function is used to display results to the user (output)

scanf function is used to read data from the user (input)

Printf function

printf(“The sum of %d and %d is: %d”, no1, no2, sum);

format marker

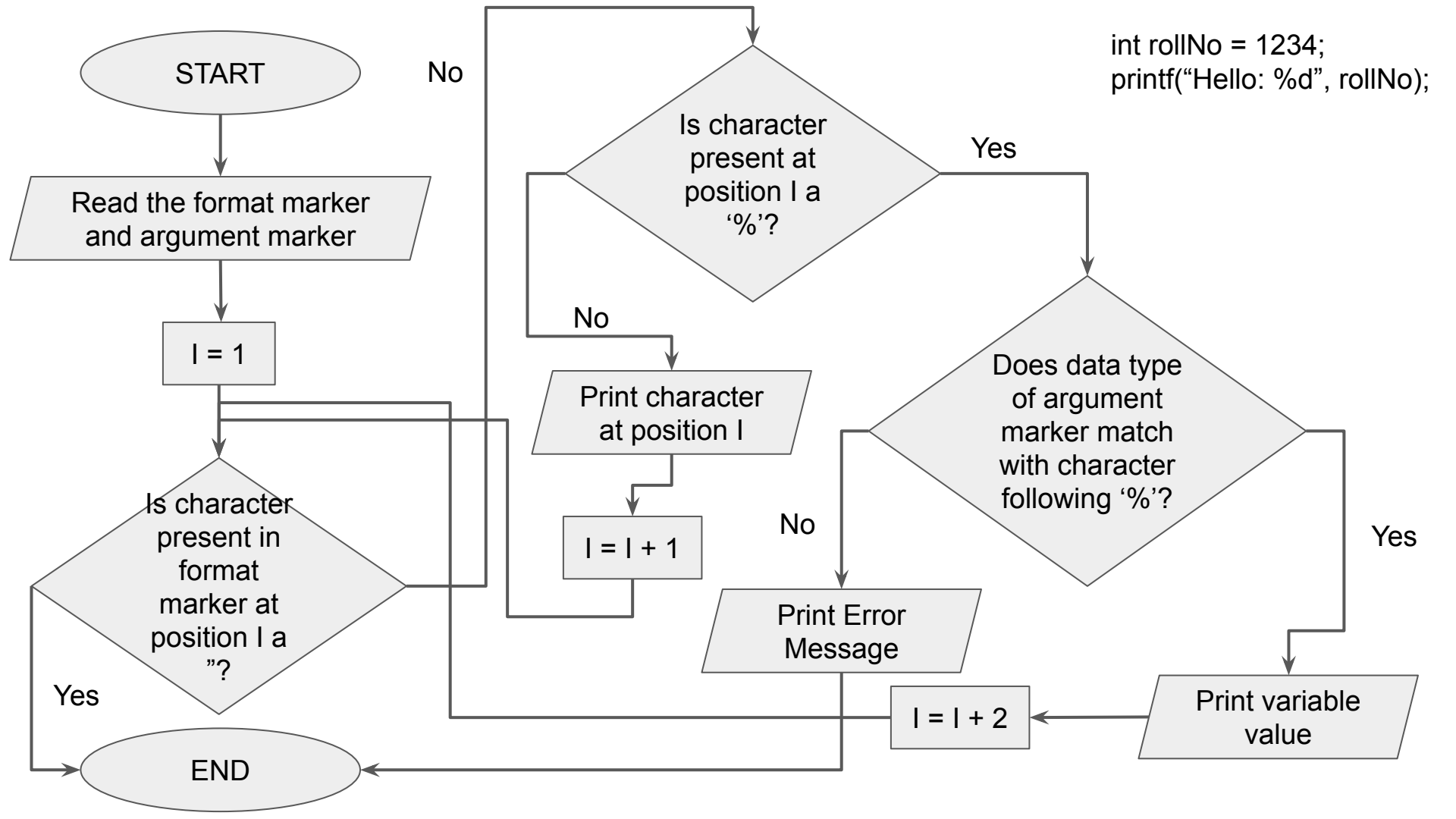
argument marker

- The format marker is printed one character at a time till a % is encountered.
- If a % is encountered, then the argument marker is used one value at a time.
- The string terminates at ”.

Flowchart for printf function

Can you draw the flowchart for printf function?

What all things you need to consider?


START
Read the format marker and argument marker
I = 1
Is character present in format marker at position I a ”?
Yes
END
No
Is character present at position I a ‘%’?
No
Print character at position I
I = I + 1
Yes
Does data type of argument marker match with character following ‘%’?
No
Print Error Message
Yes
Print variable value
I = I + 2
int rollNo = 1234;
printf(“Hello: %d”, rollNo);

Scanf function

scanf(“%d”, &no2);

format marker argument marker

- & is called address-of operator.
- Since scanf is an input function, the value from the user should be stored in memory location.
- The address-of operator is used to give address of the memory location.

```
int no1;
scanf(“%d”, &no1);
```

```
float length;
scanf(“%f”, &length);
```

```
char gender;
scanf(“%c”, &gender);
```

Scanf function (contd.)

What will be the output of the following code?

```
#include<stdio.h>
void main() {
        int no1, no2;
        printf("\n Enter two numbers:\n");
        scanf("%d, %d", &no1, &no2);
        printf("Two numbers are:%d and %d", no1, no2);
}
```

Depends on what input you have given. Format is important.

Programs to code

- Write a program to read the side of a square and displays the area along with the side.
- Write a program to read the length and width of a rectangle and displays the area along with the side.
- Write a program to read the price of an item in decimal form (like 15.95) and print the output in paise (1595 paise).
- Write a program that requests two float type numbers from the user and then divides the first number by the second and displays the result along with the numbers.
- Write a program to read the radius of a circle and displays the area along with the radius.

Operators and Expressions

Based on number of operands

- Unary operator (single operand)
- Binary operator (two operands)
- Ternary operator (three operands)

Types of operators

- Arithmetic operators
- Relational operators
- Logical operators
- Increment and decrement operators
- Assignment operators
- Conditional operators
- Bitwise operators
- Special operators

Arithmetic Operators

+	Addition or unary plus
-	Subtraction or unary minus
*	Multiplication
/	Division
%	Modulo division

Unary Operators

Operators that take only one argument

- -5
- +3
- -no1

The / Operator: for integers

When both operand of / are of type integer

- Result is integer part of the division
- Result is of type integer (floor value of the actual result)

9/2 gives output 4

1/2 gives output 0

The / Operator: for float

When either or both operand of / are of type float

- Result is same as real division
- Result is of type float

9/2 gives output 4.5

1/2 gives output 0.5

The % Operator

The remainder operator or % operator returns integer remainder of the division.

Both operands must be integer

4%2 gives output 0

31%3 gives output 1

Division / and Remainder %

Second operand cannot be 0

- else run time error

What will be the output of the following?

8/-3

8%-3

Relational Operators

<	is less than
<=	is less than or equal to
>	is greater than
>=	is greater than or equal to
==	is equal to
!=	is not equal to

Relational Operators (contd.)

The result of the expression is always TRUE (1 or non-zero) or FALSE (0).

```
#include<stdio.h>
void main() {
        printf("%d", 8 < 3);
        printf("%d", 8 <= 3);
        printf("%d", 8 > 3);
        printf("%d", 8 >= 3);
        printf("%d", 8 == 3);
        printf("%d", 8 != 3);
}
```

Logical Operators

&&	Logical AND
||	Logical OR
!	Logical NOT

The result of the expression is always TRUE or FALSE.

Truth Table

A	B	A && B
0	0	0
0	1	0
1	0	0
1	1	1

A	B	A || B
0	0	0
0	1	1
1	0	1
1	1	1

A	! A
0	1
1	0

Operator Chain

A || B || C || D || …. || Z

Condition check till true is found.

A && B && C && D && …. && Z

Condition check till the end.

Increment and Decrement Operators

Pre-increment	++A
Post-increment	A++
Pre-decrement	--A
Post-decrement	A--

Program

```
#include<stdio.h>
void main() {
        int a = 2;
        printf(“%d”, a++);
        printf(“%d”, ++a);
        printf(“%d”, a--);
        printf(“%d”, --a);
}
```

What about the following program?

```
#include<stdio.h>
void main() {
        int a = 2;
        a++;
        printf(“%d”, a);
        ++a;
        printf(“%d”, a);
}
```

Assignment Operators

A = A + 1	A += 1
A = A - 1	A -= 1
A = A * 5	A *= 5
A = A / 5	A /= 5
A = A % 5	A %= 5

The advantage of assignment operators:

1. Reduced code
2. Evaluated only once

Complex Expression

A = 5;

A += ++A + 5;

Thank You!!