
PG – DESD

Module – Embedded C Programming

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printf() and scanf()

- `#include <stdio.h>` -- function declaration
- `printf()`
 - Used to print values & string on terminal.
 - Various format specifiers `%d`, `%c`, `%f`, ...
 - Formatting: `%5d`, `%-7d`, `%8.2f`, ...
- `scanf()`
 - Used to input values from user.
 - Same format specifiers as of `printf()`.
 - Do not use any char other than format specifiers in format string.
 - To skip a char from input use `%c`.



Operators

- Types of operators
 - Arithmetic Operators (+ , - , * , / , %)
 - Assignment & shorthand Operators (= , += , -= , *= , /= , %= , &= , |= , ^= , ~= , <<= , >>= , ++ , --)
 - Relational Operators (< , <= , > , >= , !=)
 - Logical Operators (&& , || , !)
 - Conditional Operator (? :)
 - Bitwise Operators (& , | , ^ , ~ , << , >>)
 - Special Operator (, , sizeof() , [] , * , & , →)
- Types of operators
 - Unary Operators (+ , - , ++ , -- , & , *)
 - Binary Operators (+ , - , * , += , ...)
 - Ternary Operators (? :)



Operators Precedence and Associativity

OPERATOR	TYPE	ASSOCIIVITY
() [] . ->		left-to-right
++ -- + - ! ~ (type) * & sizeof	Unary Operator	right-to-left
* / %	Arithmetic Operator	left-to-right
+ -	Arithmetic Operator	left-to-right
<< >>	Shift Operator	left-to-right
< <= > >=	Relational Operator	left-to-right
== !=	Relational Operator	left-to-right
&	Bitwise AND Operator	left-to-right
^	Bitwise EX-OR Operator	left-to-right
	Bitwise OR Operator	left-to-right
&&	Logical AND Operator	left-to-right
	Logical OR Operator	left-to-right
? :	Ternary Conditional Operator	right-to-left
= += -= *= /= %= &= ^= = <<= >>=	Assignment Operator	right-to-left
,	Comma	left-to-right



Arithmetic operators

- Arithmetic operators work with all primitive data types i.e. int, float, char, double.
- Precedence of * & / is higher than + & -.
- % operator doesn't work with float and double type.
- % operator follows sign of numerator
- If two operands are of different types, the lower type is promoted temporarily for computation.
- char and short are promoted temporarily for computation.
- Char types are treated as integers (ASCII values) for calculation.
- If result exceed range of data type (overflow), then it rollback.



Short-hand operators

- Short-hand operators will change value in variable.
- `+=`, `-=`, ...
 - `num+=2;`
 - `num=+2;`
 - `num-=2;`
 - `num=-2;`
- Pre-increment/decrement
 - `x = ++a;`
 - `y = --b;`
- Post-increment/decrement
 - `x = a++;`
 - `y = b--;`



Comma, Relational and logical operators

- Comma operator
 - evaluate to right-most value.
 - have lowest precedence.
- Relational and logical operators result in 0 or 1.
 - 0 – indicate false condition
 - 1 – indicate true condition
- Relational operators
 - <, >, <=, >=, ==, !=
- Logical operators
 - &&, ||, !

```
#include <stdio.h>
int main(void)
{
    int a = -10, b = 3, c = 0, d;
    d = a++ || ++b && c++;
    printf("%d, %d, %d, %d, ", a, b, c, d);
    a = -10, b = 3, c = 0;
    d = c++ && ++b || a++;
    printf("%d, %d, %d, %d", a, b, c, d);
    return 0;
}
```





Thank you!

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