Bitmanipulation Cheat Sheet

by Miracoli via cheatography.com/32795/cs/10158/

Operations

operation	example	before	after
NOT	x = ~0111;		1000
AND	x = 0101 & 0011;		0001
OR	x = 0101 | 0011;		0111
XOR	x = 0101 ^ 0011;		0110
Left Shift	x = 0100 << 1;		1000
Right Shift	x = 0100 >> 1;		0010
Set bit 5	x |= (1<<5);	0b00000000	0b00100000
Clear bit 5	x &= ~(1<<5);	0b11111111	0b11011111
Wait until bit 5 is set	while (!(x & (1<<5)));		
Wait until bit 5 is cleared	while (x & (1<<5));		
Save value of bit 5 into variable	int var = x & (1<<5);		
Test if bit 5 is set	if (x & (1<<5)) {...}		
Toggle bit 5	x ^= (1<<5);	0b00000000	0b00100000
Replace modulo of power of two with AND	x % y == x & (y -1)	x % 64	x & (63)
Check if integer x is odd	if (x & 1) { ... }		
Turn off the rightmost 1-bit	x = x & (x-1);	0b01011000	0b01010000
Isolate the rightmost 1-bit	x = x & (-x);	0b01110000	0b00010000
Right propagate the rightmost 1-bit	x = x | (x-1);	0b10111100	0b10111111
Isolate the rightmost 0-bit	x = ~x & (x+1);	0b01110111	0b00001000
Turn on the rightmost 0-bit.	x = x | (x+1);	0b01110111	0b01111111
Right propagate the rightmost 0-bit	x = x & (x+1);	0b01110111	0b01110000
Multiply by 2	x <<= 1;	0b00000010	0b00000100
Divide by 2	x >>= 1;	0b00000010	0b00000001
XOR swap	a ^= b; b ^= a; a ^= b;		
Calculate 2^n	1 << n;		
Convert letter to lowercase	x = (x | ' ');	A	a
Convert letter to uppercase	x = (x & '_');	a	A
Swap Nibbles	x = (x << 4) | (x >> 4);	0b11110000	0b00001111

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