

cd pub/cs240

lu/data/ug/park/pub/cs240/

[could be <sup>complicate</sup> data structure]

input data :  $x$

mask :  $m$

output :

```
// Program to inspect the 32 bits of unsigned int number
#include <stdio.h>

int main()
{
    int i;
    unsigned int x, y, m;

    // read input
    scanf("%u", &x);

    // set mask to 00 ... 01
    m = -(0 << 1);

    // loop over all 32 bits from lsb to msb
    for(i=0; i<32; i++) {
        // zero out all bits but for lsb
        y = x & m;
        printf("%u\n", y);
        // right shift to inspect the next significant bit
        x = x >> 1;
    }
}
```

32-bit

$X = \overbrace{x_{31} \ x_{30} \ \dots \ x_2 \ x_1 \ x_0}$

$m = \underbrace{0 \ 0 \ \dots \ 0 \ 0}_\text{ignore by mask} \mid$

And

$y = \boxed{0 \ 0 \ \dots \ 0 \ 0 \mid x_0}$

↓  
0 or 1  
interpreted as whatever you want

unsigned int :

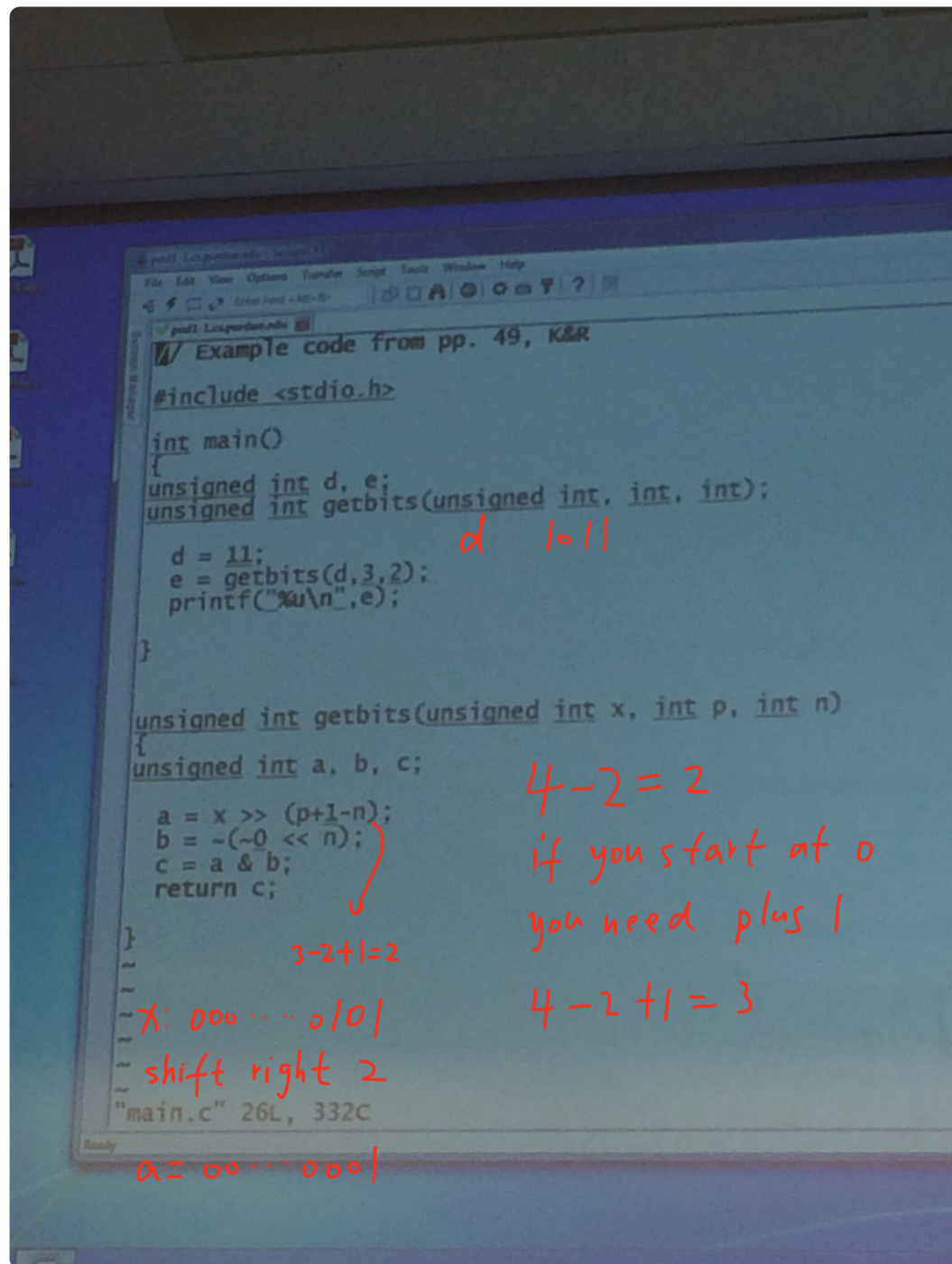
$x_i \gg 1$  right shift by 1  
 empty (fill with 0, typically)  
 $\boxed{\phantom{00000000000000000000000000000000}} X_{31} X_{30} \dots X_2 X_1$   
 32 bit

easy way:

32 bit  
 $m = 1$   $000 \dots 0001$   
 $\uparrow$  4 bit  $\uparrow$  4 bit  
 $m = 0x00000001$  (Hex number)

IP address 32 bit long

$128.10.0.0$   
 Zip code street and street number  
 $\downarrow \downarrow$   
 $1111 \dots 1111$   $0000 \dots 0000$  (mask)  
 16 bit 16 bit  
 $\downarrow \downarrow$   
 $X_{31} X_{30} \dots X_{17} X_{16}$   $00 \dots 000$   
 4 bit 16 bit 16 bit  
 $m = 0xFFFF0000$  (Hex)  
 4 bit 16 bit 16 bit



$\sim 0 \quad 1111 \dots 1111$   
 $\sim 0 \ll n: 1111 \dots 1100$   
 $n = 2$   
 $b = \sim(\sim 0 \ll 2): 0000 \dots 0011$

first two bits

And

0000...0010 a

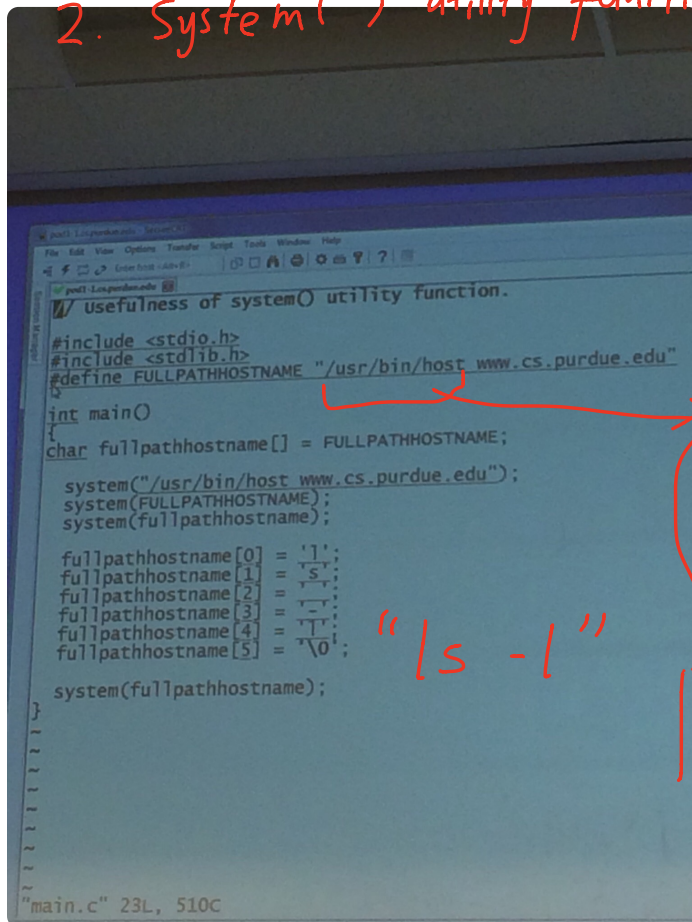
C = 0000...0010

window size n;

start from: p;

## 2. System() utility function

run in shell



```
// Usefulness of system() utility function.
#include <stdio.h>
#include <stdlib.h>
#define FULLPATHHOSTNAME "/usr/bin/host www.cs.purdue.edu"

int main()
{
    char fullpathhostname[] = FULLPATHHOSTNAME;
    system("/usr/bin/host www.cs.purdue.edu");
    system(FULLPATHHOSTNAME);
    system(fullpathhostname);

    fullpathhostname[0] = '/';
    fullpathhostname[1] = 's';
    fullpathhostname[2] = '-';
    fullpathhostname[3] = 'l';
    fullpathhostname[4] = '\0';
    system(fullpathhostname);
}
```

binary code  
already been  
compile, linked

legacy app

Not function

↓  
library