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第一章 计算机系统第二次小班讨论

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计算机系统第二次小 班讨论

参考网址：

[ieee浮点数格式转换](#)

[进制转换网站](#)

运行程序

```

> gcc -o 1 1.c
1.c: In function 'main':
1.c:11:10: warning: format '%d' expects argument of type 'int', but argument 2 has type 'long unsigned int' [-Wformat=]
11 | printf("%d\n", sizeof(float));
    |             ^~~~~~
    |             |
    |             int      long unsigned int
    |             %ld
1.c:13:10: warning: format '%s' expects argument of type 'char *', but argument 2 has type 'float *' [-Wformat=]
13 | printf("%s\n", a);
    |             ^~
    |             |
    |             float *
    |             char *
~/文档/lab/cs-discussion/second/csapp 14:26:30
> ./1
4
Hello world
~/文档/lab/cs-discussion/second/csapp 14:26:39
>

```

分析：

显然第一行的4是float的size

第二行，由于赋值时给a数组定义的类型为float，但输出时以%s的字符串为类型输出，因此会出现 **hello world** 这样奇怪的输出。

让我们看看为什么会输出hello world:

首先是 `a[3]=`
`{1143139122437582505939828736.0,764820072347794986`
`39230238720.0,9.222452464 e**- 39}`

在1.c中添加如下代码作为 2.c 来查看a数组的表示：

```
unsigned int *a0 = (unsigned int*)&a[0];
printf("a0=%X\n", *a0);
```

```
unsigned int *a1 = (unsigned int*)&a[1];
printf("a1=%X\n", *a1);
```

```
unsigned int *a2 = (unsigned int*)&a[2];
printf("a2=%X\n", *a2);
```

编译运行结果如下：

```
> gcc -o 2 2.c
2.c: In function 'main':
2.c:13:10: warning: format '%d' expects argument of type 'int', but argument 2 has type 'long unsigned int' [-Wformat=]
   13 | printf("%d\n", sizeof(float));
      |           ~~~~~^~~~~~
      |           |         |
      |           int      long unsigned int
      |           %ld
2.c:15:10: warning: format '%s' expects argument of type 'char *', but argument 2 has type 'float *' [-Wformat=]
   15 | printf("%s\n", a);
      |           ~~~~^~~~
      |           |   |
      |           |   float *
      |           char *
> ./2
4
Hello world
a0=6C6C6548
a1=6F77206F
a2=646C72
~/文档/lab/cs-discussion/second/csapp 15:05:57
```

而由于现代操作系统大都采用小端法存储数据，因此其在内存中的表示应该是：

从右到左				
a0	0x48	0x65	0x6c	0x6c
a1	0x6f	0x20	0x77	0x6f
a2	0x72	0x6c	0x64	0x00

转为10进制：

```
> python3
Python 3.9.7 (default, Sep 10 2021, 14:59:43)
[GCC 11.2.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> int('0x48', 16)
72
~~~ ■
```

从右到左				
a0	72	101	108	108
a1	111	32	119	111

从右到左				
a2	114	108	100	0

转为ascii码：

```
> python3
Python 3.9.7 (default, Sep 10 2021, 14:59:43)
[GCC 11.2.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> chr(72)
'H'
>>> █
```

从右到左				
a0	H	e	l	l
a1	o	'	w	o
a2	r	l	d	

因此会输出这样的结果

INT

显然，我们只要把数据该为int存在内存时对应于hello world的数据即可，代码为 3.c

```
#include <stdio.h>

int main()

{

    int    a[3]={1819043144,1870078063,6581362};

    unsigned int *a0 = (unsigned int*)&a[0];
    printf("a0=%X\n", *a0);


    unsigned int *a1 = (unsigned int*)&a[1];
    printf("a1=%X\n", *a1);


    unsigned int *a2 = (unsigned int*)&a[2];
    printf("a2=%X\n", *a2);
```

```
printf("%d\n", sizeof(float));
```

```
printf("%s\n", a);
```

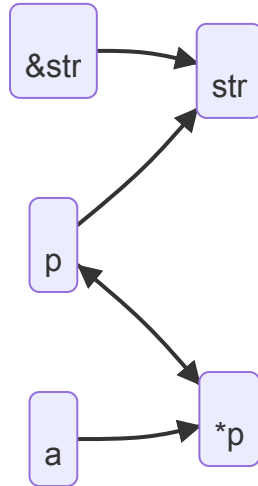
```
return 0;
```

```
}
```

```
> gcc -o 3 3.c
3.c: In function 'main':
3.c:26:10: warning: format '%d' expects argument of type 'int', but argument 2 has type 'long unsigned int' [-Wformat=]
   26 | printf("%d\n", sizeof(float));
      |           ^~~~~~
      |           |
      |         int long unsigned int
      |         %ld
3.c:28:10: warning: format '%s' expects argument of type 'char *', but argument 2 has type 'int *' [-Wformat=]
   28 | printf("%s\n", a);
      |           ^~
      |           |
      |         int *
      |         char *
      |         %ls
> ./3
a0=6C6C6548
a1=6F77206F
a2=646C72
4
Hello world
```


代码

代码解释：



```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
int main()
{
    char str[20]={"Hello world"};
    printf("%d\n",&str);
    float *xp,*yp,*zp;
    float a[3];
    xp=str;yp=(str+4);zp=(str+8);
    a[0]=*xp;
```

```

    a[1]=*yp;
    a[2]=*zp;
    printf("%f\n",a[0]);
    printf("%f\n",a[1]);
    printf("%f\n",a[2]);
    int *xx,*yy,*zz;
    int b[3];
    xx=str;yy=(str+4);zz=(str+8);
    b[0]=*xx;
    b[1]=*yy;
    b[2]=*zz;
    printf("%d\n",b[0]);
    printf("%d\n",b[1]);
    printf("%d\n",b[2]);
    return 0;
}

```



```

> ./4
-24704704
1143139122437582505939828736.000000
76482007234779498639230238720.000000
0.000000
1819043144
1870078063
6581362
~/文档/lab/cs-discussion/seco
>

```

指令

我觉得会,但我不会