实验 2 实验报告

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1.make

在实验报告中回答以下问题:

- *本程序的编译使用哪个编译器?*

  `gcc`
- *采用哪个命令，可以将所有程序全部编译?*

  `$ make all`
- *采用哪个命令，可以将所有上次编译的结果全部删除?*

  `$ make clean`
- *文件中第几行生成 btest 的目标文件?*

  第11行
- *文件中第几行生成 fshow 的目标文件?*

  第14行
- *如果在 Makefile 文件中用要引用变量“FOO“， 怎么表示?*

  `$(FOO)`

2.位级运算、数的编码

下面给出我写的函数源码:

1.allOddBits

```
int allOddBits(int x)
{
   int ans;
   const int all_odd_1 = 0xaaaaaaaa;
   int x_oddbits = all_odd_1 & x;
   ans = !(all_odd_1 ^ x_oddbits);
   return ans;
}
```

2.isLessOrEqual

```
int isLessOrEqual(int x, int y)
{
   int ans;
   int not_equal = x ^ y;
   int x_flag = x >> 31 & 1;
   int y_flag = y >> 31 & 1;
   int flag_not_equal = x_flag ^ y_flag;
   int minus = x + (~y + 1);
   int minus_flag = minus >> 31;
   ans = (!not_equal) | (flag_not_equal & x_flag) | ((!flag_not_equal) & minus_flag);
   return ans;
}
```

3.logicalNeg

```
int logicalNeg(int x)
{
   int ans;
   int neg = ~x + 1;
   int equal_to_neg = !x ^ neg;
   int is_not_int_min = !(x << 31);
   ans = equal_to_neg & is_not_int_min;
   return ans;
}
```

4.floatScale2

```c
unsigned floatScale2(unsigned uf)
{
   unsigned ans;
   unsigned e = (uf & 0x7f800000) >> 23;
   unsigned s = uf >> 31;
   unsigned m = uf & 0x007fffff;
   if (e == 0xff)
      return uf;
   if (e == 0)
   {
      if (m == 0)
         return uf;
      if (m & 0x00400000)
         e++;
      m <<= 1;
      m &= 0x007fffff;
   }
   else
   {
      e++;
      if (e == 0xff)
         m = 0;
   }
   ans = (s << 31) | (e << 23) | m;
   return ans;
}
```

5.floatFloat2Int

```c
int floatFloat2Int(unsigned uf)
{
    int ans;
    int false_num = 0x80000000u;
    unsigned bias = 0x7f;
    unsigned e = (uf & 0x7f800000) >> 23;
    unsigned s = uf >> 31 & 1;
    unsigned m = uf & 0x007fffff;
    if (e == 0xff || e >= bias + 31)
        return false_num;
    else if (e < bias)
        return 0;
    else
    {
        if (e - bias > 23)
            ans = (m | 0x00800000) << (e - bias - 23);
        else
            ans = (m | 0x00800000) >> (23 - (e - bias));
    }
    if (s)
        ans = ~ans + 1;
    return ans;
}
```

下面是得分情况的截图：

```
polaris@polaris-VirtualBox:~/course/Computer-Architecture/Experiment2$ ./btest
Score   Rating  Errors  Function
 2      2       0       allOddBits
 4      4       0       isLessOrEqual
 4      4       0       logicalNeg
 5      5       0       floatScale2
 5      5       0       floatFloat2Int
Total points: 20/20
```