```
************************************************************
Report: hw6_1
Author: F74046022 陳冠仁 <jeremy851004@gmail.com>
Class: 乙班
Description:
(float/double) <-> bit pattern
這次作業好多 0101…
************************************************************
Code:
#include <stdio.h>
#include <math.h>

int i;

int main(int argc, char *argv[])
{
	float f;
	double d;
	unsigned a, y=0x80000000U;
	//variables for float <-> binary
	unsigned long long b, z=0x8000000000000000ULL;
	//variables for double <-> binary
	char fl[32], db[64];
	//storage for binary

	printf("INPUT THE FLOAT NUMBER : ");
	scanf("%f", &f);
	a=*(unsigned*)&f;
	while(y!=0)
	{
		printf("%d", (a&y)!=0U);
		y>>=1;
	}
	a=0;
	printf("\nINPUT BINARY NUMBER TO CONVERT FLOAT NUMBER :
\n");
	scanf("%s", &fl);
	for(i=0; i<32; i++)
```

```
            if(fl[i]-48==1)  a+=pow(2,31-i);
      printf("%e", *(float*)&a);

      printf("\n\nINPUT THE DOUBLE NUMBER : ");
      scanf("%lf", &d);
      b=*(unsigned long long*)&d;
      while(z!=0)
      {
            printf("%d", (b&z)!=0ULL);
            z>>=1;
      }
      b=0;
     printf("\nINPUT BINARY NUMBER TO CONVERT DOUBLE NUMBER :
\n");
      scanf("%s", &db);
      for(i=0; i<64; i++)
            if(db[i]-48==1)  b+=pow(2,63-i);
      printf("%e\n", *(double*)&b);

      return 0;
}

Compilation:
      gcc -lm -o hw6_1 hw6_1.c

Execution:
      ./hw6_1

Output:
F74046022@c-2015-2:~/hw6> ./hw6_1
INPUT THE FLOAT NUMBER : 2.5
01000000001000000000000000000000
INPUT BINARY NUMBER TO CONVERT FLOAT NUMBER :
01000000001000000000000000000000
2.500000e+00

INPUT THE DOUBLE NUMBER : 3.5
```

```
01000000000011000000000000000000000000000000000000000000
0000000
INPUT BINARY NUMBER TO CONVERT DOUBLE NUMBER :
01000000000011000000000000000000000000000000000000000000
0000000
3.500000e+00

************************************************************
Report: hw6_2
Author: F74046022 陳冠仁 <jeremy851004@gmail.com>
Class: 乙班
Description:
************************************************************
Code:
#include <stdio.h>
#include <math.h>

union uni{
	float f;
	double d;
	unsigned a;
	unsigned long long b;
};

int main(int argc, char *argv[])
{
	union uni u;
	int i;
	unsigned y=0x80000000U;
	unsigned long long z=0x8000000000000000ULL;
	char fl[32], db[64];

	printf("INPUT THE FLOAT NUMBER : ");
	scanf("%f", &u.f);
	u.a=*(unsigned*)&u.f;
	while(y!=0)
	{
		printf("%d", (u.a&y)!=0U);
```

```
            y>>=1;
      }
      u.a=0;
      printf("\nINPUT BINARY NUMBER TO CONVERT FLOAT NUMBER :
\n");
      scanf("%s", &fl);
      for(i=0; i<32; i++)
            if(fl[i]-48==1)  u.a+=pow(2,31-i);
      printf("%e", *(float*)&u.a);

      printf("\n\nINPUT THE DOUBLE NUMBER : ");
      scanf("%lf", &u.d);
      u.b=*(unsigned long long*)&u.d;
      while(z!=0)
      {
            printf("%d", (u.b&z)!=0ULL);
            z>>=1;
      }
      u.b=0;
     printf("\nINPUT BINARY NUMBER TO CONVERT DOUBLE NUMBER :
\n");
      scanf("%s", &db);
      for(i=0; i<64; i++)
            if(db[i]-48==1)  u.b+=pow(2,63-i);
      printf("%e\n", *(double*)&u.b);

      return 0;
}

Compilation:
      gcc -lm -o hw6_2 hw6_2.c

Execution:
      ./hw6_2

Output:
F74046022@c-2015-2:~/hw6> ./hw6_2
INPUT THE FLOAT NUMBER : -2.5
```

```
11000000001000000000000000000000
INPUT BINARY NUMBER TO CONVERT FLOAT NUMBER :
11000000001000000000000000000000
-2.500000e+00

INPUT THE DOUBLE NUMBER : -3.5
1100000000001100000000000000000000000000000000000000000000000000
INPUT BINARY NUMBER TO CONVERT DOUBLE NUMBER :
1100000000001100000000000000000000000000000000000000000000000000
-3.500000e+00

------------------------------------------------------------
hw6_1.c: In function ‘main’:
hw6_1.c:24:2: error: expected ‘;’ before ‘}’ token
  }
  ^
hw6_1.c: In function ‘main’:
hw6_1.c:30:2: error: pointer value used where a floating point
value was expected
  printf("%e", *(float)&a);
  ^
hw6_1.c:30:15: error: invalid type argument of unary ‘*’ (have
‘float’)
  printf("%e", *(float)&a);
               ^
hw6_2.c: In function ‘main’:
hw6_2.c:21:5: warning: assignment makes integer from pointer
without a cast [enabled by default]
  u.a=(unsigned*)&u.f;
     ^
------------------------------------------------------------
```

(1)是

(2)00000000000000000000000000000000

(3)由於 float 有儲存上的誤差，在誤差範圍內的數字都會被省略，造成 f1=f2。