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Report: HW7
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Class: 化工 (甲班)
Description:
使用 union 和 struct 存取 float 及 double 的內容並印出
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Code:

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#include<stdio.h>
#include<stdlib.h>
#include<math.h>
union Input{
	long long int num;
	float num2;
	double num3;
};
struct input2 {
	long long int *num;
};
typedef struct input2 Input2;
typedef union Input Input;

int main(int argc,char *argv[]){
	char mode=atoi(argv[1]);
	unsigned long long int i;
	Input input;Input2 input2; double num_lf = 0;
	double num=0;double power=0; float num_f = 0;
	switch(mode){
		case 1:
			input.num2=atof(argv[2]);
			for(i=0x80000000;i;i>>=1){
				printf("%d",i&input.num?1:0);
				if(i==0x80000000)printf(" ");
				if(i==0x800000)printf(" ");
			}printf("\n");
			num_f = atof(argv[2]); input2.num = (int
*)&num_f;
			for (i = 0x100000000; i >>= 1;) {
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                        printf("%d", i&*input2.num ? 1 :
0);
                        if (i == 0x80000000 || i ==
0x800000)printf(" ");
                  }printf("\n"); break;
            case 2:input.num3=atof(argv[2]);

      for(i=0x8000000000000000;i;i>>=1){
            printf("%d",i&input.num?1:0);
            if(i==0x8000000000000000)printf(" ");
            if(i==(0x10000000000000))printf(" ");
         }printf("\n");
                  num_lf = atof(argv[2]); input2.num = (int
*)&num_lf;
                  for (i = 0x8000000000000000; i; i >>= 1)
{
                        printf("%d", i&*input2.num ? 1 :
0);
                        if (i == 0x8000000000000000 || i ==
0x10000000000000)printf(" ");
                  }
                  printf("\n"); break;
            case 3:
                  for(int i=0;i<8;i++)
            power+=((argv[3][i]=='1')?pow(2,7-i):0);
                        power-=127;
                  for(int i=0;i<23;i++)
            num+=((argv[4][i]=='1')?pow(2,power-1-i):0);
            num+=pow(2,power);atoi(argv[2])?num*=-1:num;
printf("%.3lf",num);printf("\n");num=0.0;power=0.0;
                  for (i = 0; i < 8; i++)power += argv[3][i]
== '1' ? pow(2, 7 - i) : 0; power -= 127;
                  for (i = 0; i < 23; i++)
     num += ((argv[4][i] == '1') ? pow(2, power - 1 - i) : 0);
                  num += pow(2, power);
                  atoi(argv[2]) ? num *= -1 : num;
                  printf("%.3lf", num); printf("\n");
break;
```

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            case 4:
                  for(int i=0;i<11;i++)
               power+=((argv[3][i]=='1')?pow(2,10-i):0);
               power-=1023;
           for(int i=0;i<52;i++)
               num+=((argv[4][i]=='1')?pow(2,power-1-i):0);
               num+=pow(2,power);atoi(argv[2])?num*=-1:num;
     printf("%.3lf",num);printf("\n");power=0.0;num=0.0;
                  for (i = 0; i < 11; i++)power += argv[3][i]
== '1' ? pow(2, 10 - i) : 0; power -= 1023;
                  for (i = 0; i < 52; i++)num += ((argv[4][i]
== '1') ? pow(2, power - 1 - i) : 0); num += pow(2, power);
                  argv[2][0] == '1' ? num *= -1 : num;
printf("%.3lf\n", num);   }
      return 0;
}Compilation:
      gcc -o hw7 hw7.c -lm
Execution:
      ./hw7 1 85.125
      ./hw7 2 85.125
      ./hw7 3 0 10000101 01010100100000000000000
      ./hw7 4 0 10000000101
01010100100000000000000000000000000000000000000000000

Output:
union 0 10000101 01010100100000000000000
struct 0 10000101 01010100100000000000000

union 0 10000000101
01010100100000000000000000000000000000000000000000000
struct 0 10000000101
01010100100000000000000000000000000000000000000000000

union 85.125
struct 85.125

union 85.125
struct 85.125
```