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Report: HW6\_2

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Description:

可輸入浮點數，印出bit pattern

及輸入bit pattern，印出浮點數

此次用union及bit-field讀取bit pattern

I have learn:

更熟悉struct、union、bit-field

Error message:

C14031162@c-2015-1:~/hw6> gcc -lm -o hw6\_2 hw6\_2.c

hw6\_2.c: In function ‘main’:

hw6\_2.c:99:2: error: cannot take address of bit-field ‘s32’

scanf("%1d",&input1.c.s32);

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Code:

#include <stdio.h>

#include <math.h>

//先宣告32個bit-field為1的struct裡的變數

typedef struct A{

unsigned int s1:1; unsigned int s2:1;

unsigned int s3:1; unsigned int s4:1;

unsigned int s5:1; unsigned int s6:1;

unsigned int s7:1; unsigned int s8:1;

unsigned int s9:1; unsigned int s10:1;

unsigned int s11:1; unsigned int s12:1;

unsigned int s13:1; unsigned int s14:1;

unsigned int s15:1; unsigned int s16:1;

unsigned int s17:1; unsigned int s18:1;

unsigned int s19:1; unsigned int s20:1;

unsigned int s21:1; unsigned int s22:1;

unsigned int s23:1; unsigned int s24:1;

unsigned int s25:1; unsigned int s26:1;

unsigned int s27:1; unsigned int s28:1;

unsigned int s29:1; unsigned int s30:1;

unsigned int s31:1; unsigned int s32:1;

}a;

//先宣告64個bit-field為1的struct裡的變數

typedef struct D{

unsigned int s1:1; unsigned int s2:1;

unsigned int s3:1; unsigned int s4:1;

unsigned int s5:1; unsigned int s6:1;

unsigned int s7:1; unsigned int s8:1;

unsigned int s9:1; unsigned int s10:1;

unsigned int s11:1; unsigned int s12:1;

unsigned int s13:1; unsigned int s14:1;

unsigned int s15:1; unsigned int s16:1;

unsigned int s17:1; unsigned int s18:1;

unsigned int s19:1; unsigned int s20:1;

unsigned int s21:1; unsigned int s22:1;

unsigned int s23:1; unsigned int s24:1;

unsigned int s25:1; unsigned int s26:1;

unsigned int s27:1; unsigned int s28:1;

unsigned int s29:1; unsigned int s30:1;

unsigned int s31:1; unsigned int s32:1;

unsigned int s33:1; unsigned int s34:1;

unsigned int s35:1; unsigned int s36:1;

unsigned int s37:1; unsigned int s38:1;

unsigned int s39:1; unsigned int s40:1;

unsigned int s41:1; unsigned int s42:1;

unsigned int s43:1; unsigned int s44:1;

unsigned int s45:1; unsigned int s46:1;

unsigned int s47:1; unsigned int s48:1;

unsigned int s49:1; unsigned int s50:1;

unsigned int s51:1; unsigned int s52:1;

unsigned int s53:1; unsigned int s54:1;

unsigned int s55:1; unsigned int s56:1;

unsigned int s57:1; unsigned int s58:1;

unsigned int s59:1; unsigned int s60:1;

unsigned int s61:1; unsigned int s62:1;

unsigned int s63:1; unsigned int s64:1;

}d;

//將32個bit-field為1的struct與float做union起來

typedef union B{

float f;

a c;

}b;

//將64個bit-field為1的struct與double做union起來

typedef union C{

double f;

d c;

}c;

int main()

{

int ff[32]={0},dd[64]={0},i; //ff用來暫存32 or 64 bit binary number輸入

float temp1=0; //用來暫存二進制轉十進制的總值

b input1; //宣告一個包含float的union

printf("Input the float number：");

scanf("%f",&input1.f); //輸入float值之後，因空間共用所以從一個一個1bit的變數印出

printf("%d",input1.c.s32);printf("%d",input1.c.s31);

printf("%d",input1.c.s30);printf("%d",input1.c.s29);

printf("%d",input1.c.s28);printf("%d",input1.c.s27);

printf("%d",input1.c.s26);printf("%d",input1.c.s25);

printf("%d",input1.c.s24);printf("%d",input1.c.s23);

printf("%d",input1.c.s22);printf("%d",input1.c.s21);

printf("%d",input1.c.s20);printf("%d",input1.c.s19);

printf("%d",input1.c.s18);printf("%d",input1.c.s17);

printf("%d",input1.c.s16);printf("%d",input1.c.s15);

printf("%d",input1.c.s14);printf("%d",input1.c.s13);

printf("%d",input1.c.s12);printf("%d",input1.c.s11);

printf("%d",input1.c.s10);printf("%d",input1.c.s9);

printf("%d",input1.c.s8); printf("%d",input1.c.s7);

printf("%d",input1.c.s6); printf("%d",input1.c.s5);

printf("%d",input1.c.s4); printf("%d",input1.c.s3);

printf("%d",input1.c.s2); printf("%d",input1.c.s1);

printf("\n");

input1.f=0;//初始化

printf("Input binary number to convert float number：\n");

for(i=0;i<32;i++) //先暫存32bit binary number輸入

scanf("%1d",&ff[i]);

//一個一個填到1bit的變數中

input1.c.s32=ff[0]; input1.c.s31=ff[1];

input1.c.s30=ff[2]; input1.c.s29=ff[3];

input1.c.s28=ff[4]; input1.c.s27=ff[5];

input1.c.s26=ff[6]; input1.c.s25=ff[7];

input1.c.s24=ff[8]; input1.c.s23=ff[9];

input1.c.s22=ff[10]; input1.c.s21=ff[11];

input1.c.s20=ff[12]; input1.c.s19=ff[13];

input1.c.s18=ff[14]; input1.c.s17=ff[15];

input1.c.s16=ff[16]; input1.c.s15=ff[17];

input1.c.s14=ff[18]; input1.c.s13=ff[19];

input1.c.s12=ff[20]; input1.c.s11=ff[21];

input1.c.s10=ff[22]; input1.c.s9=ff[23];

input1.c.s8=ff[24]; input1.c.s7=ff[25];

input1.c.s6=ff[26]; input1.c.s5=ff[27];

input1.c.s4=ff[28]; input1.c.s3=ff[29];

input1.c.s2=ff[30]; input1.c.s1=ff[31];

printf("f\n",input1.f);//印出float

c input2; //宣告含有double的union

printf("Input the double number：");

scanf("%lf",&input2.f); //輸入double值

//一個一個bit輸出

printf("%d",input2.c.s64);printf("%d",input2.c.s63);

printf("%d",input2.c.s62);printf("%d",input2.c.s61);

printf("%d",input2.c.s60);printf("%d",input2.c.s59);

printf("%d",input2.c.s58);printf("%d",input2.c.s57);

printf("%d",input2.c.s56);printf("%d",input2.c.s55);

printf("%d",input2.c.s54);printf("%d",input2.c.s53);

printf("%d",input2.c.s52);printf("%d",input2.c.s51);

printf("%d",input2.c.s50);printf("%d",input2.c.s49);

printf("%d",input2.c.s48);printf("%d",input2.c.s47);

printf("%d",input2.c.s46);printf("%d",input2.c.s45);

printf("%d",input2.c.s44);printf("%d",input2.c.s43);

printf("%d",input2.c.s42);printf("%d",input2.c.s41);

printf("%d",input2.c.s40);printf("%d",input2.c.s39);

printf("%d",input2.c.s38);printf("%d",input2.c.s37);

printf("%d",input2.c.s36);printf("%d",input2.c.s35);

printf("%d",input2.c.s34);printf("%d",input2.c.s33);

printf("%d",input2.c.s32);printf("%d",input2.c.s31);

printf("%d",input2.c.s30);printf("%d",input2.c.s29);

printf("%d",input2.c.s28);printf("%d",input2.c.s27);

printf("%d",input2.c.s26);printf("%d",input2.c.s25);

printf("%d",input2.c.s24);printf("%d",input2.c.s23);

printf("%d",input2.c.s22);printf("%d",input2.c.s21);

printf("%d",input2.c.s20);printf("%d",input2.c.s19);

printf("%d",input2.c.s18);printf("%d",input2.c.s17);

printf("%d",input2.c.s16);printf("%d",input2.c.s15);

printf("%d",input2.c.s14);printf("%d",input2.c.s13);

printf("%d",input2.c.s12);printf("%d",input2.c.s11);

printf("%d",input2.c.s10);printf("%d",input2.c.s9);

printf("%d",input2.c.s8); printf("%d",input2.c.s7);

printf("%d",input2.c.s6); printf("%d",input2.c.s5);

printf("%d",input2.c.s4); printf("%d",input2.c.s3);

printf("%d",input2.c.s2); printf("%d",input2.c.s1);

printf("\n");

input2.f=0;//初始化

printf("Input binary number to convert double number：\n");

for(i=0;i<64;i++) //先暫存64bit binary number

scanf("%1d",&dd[i]);

//一個一個指派給1bit的變數

input2.c.s64=dd[0]; input2.c.s63=dd[1];

input2.c.s62=dd[2]; input2.c.s61=dd[3];

input2.c.s60=dd[4]; input2.c.s59=dd[5];

input2.c.s58=dd[6]; input2.c.s57=dd[7];

input2.c.s56=dd[8]; input2.c.s55=dd[9];

input2.c.s54=dd[10]; input2.c.s53=dd[11];

input2.c.s52=dd[12]; input2.c.s51=dd[13];

input2.c.s50=dd[14]; input2.c.s49=dd[15];

input2.c.s48=dd[16]; input2.c.s47=dd[17];

input2.c.s46=dd[18]; input2.c.s45=dd[19];

input2.c.s44=dd[20]; input2.c.s43=dd[21];

input2.c.s42=dd[22]; input2.c.s41=dd[23];

input2.c.s40=dd[24]; input2.c.s39=dd[25];

input2.c.s38=dd[26]; input2.c.s37=dd[27];

input2.c.s36=dd[28]; input2.c.s35=dd[29];

input2.c.s34=dd[30]; input2.c.s33=dd[31];

input2.c.s32=dd[32]; input2.c.s31=dd[33];

input2.c.s30=dd[34]; input2.c.s29=dd[35];

input2.c.s28=dd[36]; input2.c.s27=dd[37];

input2.c.s26=dd[38]; input2.c.s25=dd[39];

input2.c.s24=dd[40]; input2.c.s23=dd[41];

input2.c.s22=dd[42]; input2.c.s21=dd[43];

input2.c.s20=dd[44]; input2.c.s19=dd[45];

input2.c.s18=dd[46]; input2.c.s17=dd[47];

input2.c.s16=dd[48]; input2.c.s15=dd[49];

input2.c.s14=dd[50]; input2.c.s13=dd[51];

input2.c.s12=dd[52]; input2.c.s11=dd[53];

input2.c.s10=dd[54]; input2.c.s9=dd[55];

input2.c.s8=dd[56]; input2.c.s7=dd[57];

input2.c.s6=dd[58]; input2.c.s5=dd[59];

input2.c.s4=dd[60]; input2.c.s3=dd[61];

input2.c.s2=dd[62]; input2.c.s1=dd[63];

printf("%lf\n",input2.f); //印出double

return 0;

}

Compilation:

gcc -lm -o hw6\_2 hw6\_2.c

Execution:

./hw6\_2

Output:

C14031162@c-2015-1:~/hw6> ./hw6\_2

Input the float number：-495.0625

11000011111101111000100000000000

Input binary number to convert float number：

11000011111101111000100000000000

-495.062500

Input the double number：-1587.375

1100000010011000110011011000000000000000000000000000000000000000

Input binary number to convert double number：

1100000010011000110011011000000000000000000000000000000000000000

-1587.375000