

教科書【練習問題 4 . 2】 解答例

```

/* メニュー */
#include <stdio.h>
#include <string.h>

#define TABLESIZE 100
#define TRUE 1
#define FALSE 0

#define average(i) ((float)((a[i].computer+a[i].english)/2)

void sortc( int );
void sorte( int );
void sorta( int );
void display( int );
int indata( void );
void outdata( int );
void seiseki( int );

struct score {
    char name[ 15 ];
    int computer;
    int english;
} a[ TABLESIZE ];

void main( void )
{
    int menu, num;

    num = 0;

    do {
        printf( "%n" );
        printf( " -----¥n" );
        printf( " | 1 : Data input |¥n" );
        printf( " | 2 : Data display |¥n" );
        printf( " | 3 : Graph display |¥n" );
        printf( " | 4 : Data sort (Computer) |¥n" );
        printf( " | 5 : Data sort (English) |¥n" );
        printf( " | 6 : Data sort (Average) |¥n" );
        printf( " | 7 : Judge |¥n" );
        printf( " | |¥n" );
        printf( " | 9 : EXIT |¥n" );
        printf( " -----¥n" );
        printf( " Please select menu number. " );

        scanf( "%d", &menu );

        switch ( menu ){
            case 1 :
                num = indata();
                break;
            case 2 :
                outdata( num );

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        break;
    case 3 :
        display( num );
        break;
    case 4 :
        sortc( num );
        break;
    case 5 :
        sorte( num );
        break;
    case 6 :
        sorta( num );
        break;
    case 7 :
        seiseki( num );
        break;
    case 9 :
        printf( "%n    Program terminated. Thank you! %n" );
        break;
    default :
        break;
}
} while( menu != 9 );
}

```

/\* 計算機の成績の順にソートする \*/

```

void sortc( int count )
{
    struct score temp;
    int swapped, i;

    printf( "%n" );
    if ( count == 0 )
        printf( "    データがまだ入力されていません。 %n" );
    else{
        do {
            swapped = FALSE;
            for ( i = 0 ; i < count -1 ; i++ )
                if ( a[i].computer > a[i+1].computer ){
                    temp = a[i];
                    a[i] = a[i+1];
                    a[i+1] = temp;
                    swapped = TRUE;
                }
        } while( swapped );
        printf( "    Sort finished %n" );
    }
}

```

/\* 英語の成績の順にソートする \*/

```

void sorte( int count )
{
    struct score temp;

```

```

int          swapped, i;

printf( "¥n" );
if ( count == 0 )
    printf( "          データがまだ入力されていません。¥n" );
else{
    do {
        swapped = FALSE;
        for ( i = 0 ; i < count-1 ; i++ )
            if ( a[i].english > a[i+1].english ){
                temp = a[i];
                a[i] = a[i+1];
                a[i+1] = temp;
                swapped = TRUE;
            }
    } while( swapped ) ;
    printf( "          Sort finished¥n" );
}
}

```

/\* 平均点の成績の順にソートする \*/

```

void  sorta( int count )
{
    struct score  temp;
    int          swapped, i;

    printf( "¥n" );
    if ( count == 0 )
        printf( "          データがまだ入力されていません。¥n" );
    else{
        do {
            swapped = FALSE;
            for ( i = 0 ; i < count-1 ; i++ )
                if ( average(i) > average(i+1) ){
                    temp = a[i];
                    a[i] = a[i+1];
                    a[i+1] = temp;
                    swapped = TRUE;
                }
        } while( swapped ) ;
        printf( "          Sort finished¥n" );
    }
}

```

/\* 棒グラフを描く \*/

```

void  display( int count )
{
    int i, j, cnt;

    printf( "¥n" );
    if ( count == 0 )
        printf( "          データがまだ入力されていません¥n" );
    else{

```

```

        printf( "    name        comp  engl  ave\n" );
        for ( i = 0 ; i < count ; i++ ){
            printf( "%15s%5d%5d%7.1f ", a[ i ].name, a[ i ].computer,
                    a[ i ].english, average(i));
            cnt = ( a[i].computer + a[i].english )/5;
            for ( j = 0 ; j < cnt ; j++ )
                printf( "*" );
            printf( "\n" );
        }
    }
}

/* データの入力 */
int    indata( void )
{
    int    num;
    char    fname[ 20 ], buff[ 80 ];
    FILE    *scoredata;

    printf( "\n" );
    printf( "    データファイル名? " );
    scanf( "%s", fname );
    if ( NULL == ( scoredata = fopen( fname, "r" )))
    {
        printf( "    ファイルがオープンできません\n" );
        exit( 1 );
    }
    num = 0;
    while( 0 == feof( scoredata ))
    {
        fscanf( scoredata, "%15s%5d%5d", a[ num ].name, &a[ num ].computer,
                &a[ num ].english );

        num++;
    }
    close( scoredata );
    printf( "\n" );
    printf( "    %3drecords read\n", --num );
    return( num );
}

/* 成績表の表示 */
void    outdata( int count )
{
    int i;

    printf( "\n" );

    if ( count == 0 )
        printf( "    データを入力してください\n" );
    else{
        printf( "    name        comp  engl  ave\n" );
        for ( i = 0 ; i < count ; i++ )
            printf( "%15s%5d%5d%7.1f\n", a[ i ].name, a[ i ].computer,

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        a[ i ].english, average(i) );
    }
}

/* 成績判定 */
void seiseki( int count )
{
    int i;
    char abcd[4][5]={"優","良","可","不可"}, hantei[3][5];

    printf( "¥n" );

    if ( count == 0 )
        printf( "      データを入力してください¥n" );
    else{
        printf( "      name          comp          engl          ave¥n" );
        for ( i = 0 ; i < count ; i++){

            if( a[i].computer >= 80 ) strcpy(hantei[0],abcd[0]);
            else if( a[i].computer >= 70 ) strcpy(hantei[0],abcd[1]);
            else if( a[i].computer >= 60 ) strcpy(hantei[0],abcd[2]);
            else strcpy(hantei[0],abcd[3]);

            if( a[i].english >= 80 ) strcpy(hantei[1],abcd[0]);
            else if( a[i].english >= 70 ) strcpy(hantei[1],abcd[1]);
            else if( a[i].english >= 60 ) strcpy(hantei[1],abcd[2]);
            else strcpy(hantei[1],abcd[3]);

            if( average(i) >= 80 ) strcpy(hantei[2],abcd[0]);
            else if( average(i) >= 70 ) strcpy(hantei[2],abcd[1]);
            else if( average(i) >= 60 ) strcpy(hantei[2],abcd[2]);
            else strcpy(hantei[2],abcd[3]);

            printf( "%15s%5d%5s %5d%5s %7.1f%5s ¥n",
                a[ i ].name, a[ i ].computer, hantei[0],
                a[ i ].english, hantei[1], average(i), hantei[2] );
        }
    }
}

```