Bug report

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Bug observation 1:

```
    char inputFile[] =  "wordlist.txt";
    int size;
    //create list using the input file
    char **actualList = read_words(inputFile,&size);
    sort_words(actualList,size);

    char *expectedList[]={"apple","banana","hello","milan","programming","zebra"};

    int i;
    for (i=0;i<size;i++)
        CuAssertStrEquals(tc, expectedList[i], actualList[i]);

}

void TestQ2_readandSort2(CuTest *tc) {

    char inputFile[] =  "wordlist.txt";
    int size;
    //create list using the input file
    char **actualList = read_words(inputFile,&size);
    sort2_words(actualList,size);
```

The Program cannot compile since the test cases is broken.

Analysis:
There is NULL function called 'sort_word'; I guess the question wanna to use the function called sort_words_selection.

Validation:

```
Question2.c:68:11: warning: assignment from incompatible pointer type [-Wincompatible-pointer-types]
     *str2 = Temp;
           ^
gcc -o Lab3 AllTests.o testCases.o CuTest.o Question1.o Question2.o -I. -lm -g

c:\Users\Xikai Xu\Coding\COE2SH4\classs week 10\lab-3-intelpentium4extreme-xu503>Lab3.exe
......................FF

There were 2 failures:
1) TestQ2_readandSort1: testCases.c:287: expected <milan> but was <hello>
2) TestQ2_readandSort2: testCases.c:306: expected <milan> but was <hello>

!!!FAILURES!!!
Runs: 24 Passes: 22 Fails: 2


c:\Users\Xikai Xu\Coding\COE2SH4\classs week 10\lab-3-intelpentium4extreme-xu503>
```

Fine for compile

Bug observation 2:

```
Question2.c:68:11: warning: assignment from incompatible pointer type [-Wincompatible-pointer-types]
     *str2 = Temp;
           ^
gcc -o Lab3 AllTests.o testCases.o CuTest.o Question1.o Question2.o -I. -lm -g

c:\Users\Xikai Xu\Coding\COE2SH4\classs week 10\lab-3-intelpentium4extreme-xu503>Lab3.exe
.....................FF

There were 2 failures:
1) TestQ2_readandSort1: testCases.c:287: expected <milan> but was <hello>
2) TestQ2_readandSort2: testCases.c:306: expected <milan> but was <hello>

!!!FAILURES!!!
Runs: 24 Passes: 22 Fails: 2


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```

There still have 2 failures inside of the randandsort function:

Analysis:

Using GDB to set a break point to the Q2,c line 126 as known as the swap loop;

```
[New Thread 4816.0x2264]
[Inferior 1 (process 4816) exited normally]
(gdb) b Question2.c :126
Breakpoint 1 at 0x4034dd: file Question2.c, line 126.
(gdb) r
Starting program: c:\Users\Xikai Xu\Coding\COE2SH4\classs week 10\lab-3-intelpentium4extreme-xu503/Lab3.exe
[New Thread 2228.0xc94]

Breakpoint 1, sort_words_Selection (words=0xba5040, size=6) at Question2.c:126
warning: Source file is more recent than executable.
126         for(i = 0; i < size; i++)
(gdb) i local
i = 6
j = 6
minIndex = 6
(gdb)
```

At the gate of finding the error, which this place I have value which means the initial data has been successfully initialed by other chunks of data.

Continuous giving two brak point at line 130 && 138 which is a clear Op to the list:

```
126         for(i = 0; i < size; i++)
(gdb) ilcoal
Undefined command: "ilcoal".  Try "help".
(gdb) i local
i = 6
j = 6
minIndex = 6
(gdb) c
Continuing.

Breakpoint 2, sort_words_Selection (words=0xdf5040, size=6) at Question2.c:130
130             for(j = i + 1; j < size; j++)
(gdb) i local
i = 0
j = 6
minIndex = 0
(gdb)
```

```
Breakpoint 2, sort_words_Selection (words=0xdf5040, size=6) at Question2.c:130
130             for(j = i + 1; j < size; j++)
(gdb) i local
i = 0
j = 6
minIndex = 0
(gdb) c
Continuing.

Breakpoint 3, sort_words_Selection (words=0xdf5040, size=6) at Question2.c:138
138             if(minIndex != j)     // something weared about this
(gdb) i local
i = 0
j = 6
minIndex = 5
(gdb)
```

After looking at the I local for the multiple loops of running, we can find that I is not always the small num, but the min works as a passing layer. So, if we want to make once swap in the process, so we want to swap If I value is not the min_num, which leads to the problem of wrong swapping conditions.

Possible outcomes: wrong swapping conditions

Fix:

```
int i, j;
int min, minIndex;

for(i = 0; i < size; i++)
{
    minIndex = i;

    for(j = i + 1; j < size; j++)
    {
        if(my_strcmpOrder(words[minIndex], words[j]) == 1) //wt
        {
            minIndex = j;
        }
    }
```

By swapping conditions, where if words[minIndex is larger than word[j]]which give a true condition, make a swap;

Continuous fixing:
Since all of the Function is in the same time track in the for loop;

```
Starting program: c:\Users\Xikai Xu\Coding\COE2SH4\classs week 10\lab-3-intelpentium4extreme-xu503/Lab3.exe
[New Thread 920.0x15f0]
[New Thread 920.0xaf4]

Breakpoint 1, sort_words_Selection (words=0xe45040, size=6) at Question2.c:138
138             if(minIndex != i)     // something weared about this
(gdb) c
Continuing.

Breakpoint 1, sort_words_Selection (words=0xe45040, size=6) at Question2.c:138
138             if(minIndex != i)     // something weared about this
(gdb) i local
i = 1
j = 6
minIndex = 5
(gdb)
```

Note: after bypassing the actual small value through J, which means J now is the small value, which leads to the conclusion that if the min num is not I, the front number, which needs to make a swap and let the j pos data to the front.

Fix:

```
    if(minIndex != i)     // something weared about this
    {
        swap(&words[i], &words[minIndex]);
    }

}
```

By compared with the I value to get weather we needs to make a swap overlap;

Bug Fix validation:

```
Quit anyway? (y or n) y
error return ../../gdb-7.6.1/gdb/windows-nat.c:1275 was 5

c:\Users\Xikai Xu\Coding\COE2SH4\classs week 10\lab-3-intelpentium4extreme-xu503>Lab3.exe
........................

OK (24 tests)


c:\Users\Xikai Xu\Coding\COE2SH4\classs week 10\lab-3-intelpentium4extreme-xu503>
```