Write a program to verify if you can open a file with the append flag to:

(1) Read from the specific place in the file using lseek.

Ans: Yes，即使用 append flag，還是可以用 lseek 調整文件的讀寫指針從任意位置讀取檔案。

(2) Write data at the specific place in the file using lseek.

Ans: No，若有使用 append flag 開啟檔案，即使用 lseek 移動文件的讀寫指針，每次寫入還是只會追加到文件的尾端。

Result screenshots (try):

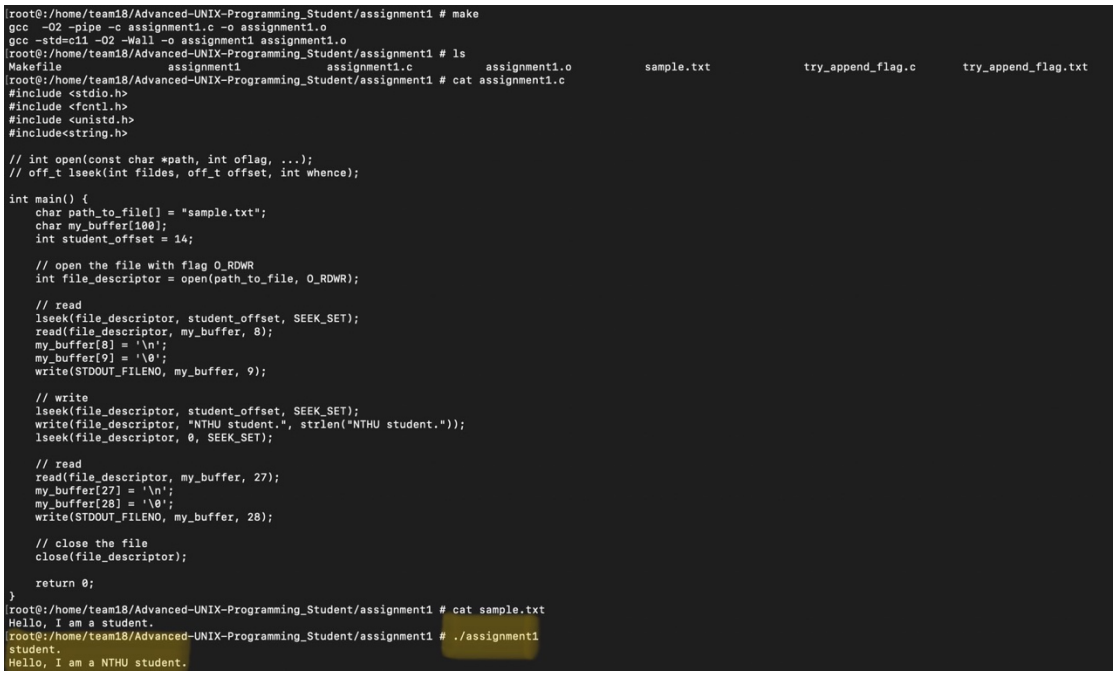
```c
#include <stdio.h>
#include <fcntl.h>
#include <unistd.h>

// int open(const char *path, int oflag, ...);
// off_t lseek(int fildes, off_t offset, int whence);
int main() {
    char path_to_file[] = "try_append_flag.txt";
    char my_buffer[100];

    int file_descriptor = open(path_to_file, O_APPEND | O_RDWR);

    lseek(file_descriptor, -10, SEEK_END);
    read(file_descriptor, my_buffer, 10);
    printf("%s\n", my_buffer);

    lseek(file_descriptor, -10, SEEK_END);
    write(file_descriptor, "test", 4);

    close(file_descriptor);

    return 0;
}
```

```
jim@youjunliangdeMacBook-Pro assignment1 % cat try_append_flag.txt
We are team18!%
jim@youjunliangdeMacBook-Pro assignment1 % ./try_append_flag
re team18!
jim@youjunliangdeMacBook-Pro assignment1 % cat try_append_flag.txt
We are team18!test%
jim@youjunliangdeMacBook-Pro assignment1 %
```

Assignment1 code explain:

1. 若單獨使用 O_APPEND flag 開啟 sample.txt，只能讀取文件，不能寫入文件。若同時使用 O_APPEND flag 以及 O_RDWR flag 開啟 sample.txt，檔案會無法在指定位置寫入文字，每次寫入只能追加到文件的尾端，因此我們單獨使用 O_RDWR flag 開啟 sample.txt 以完成作業。
2. 用 lseek 將文件的讀寫指針移到距離文件開頭 14 個字節的位置。(將 whence 參數設為 SEEK_SET)
3. 用 read 從該位置讀取 8 個字節的數據到 my_buffer 並加上換行符號&字串結尾符號。
4. 用 write 輸出到 STDOUT_FILENO 印出 ” student.” 。
5. 再次用 lseek 將文件的讀寫指針移到距離文件開頭 14 個字節的位置。(將 whence 參數設為 SEEK_SET)。
6. 用 write 從該位置覆寫 ” NTHU student.” 。
7. 接著用 lseek 及 read 將文件指針移回文件開頭，讀取前 27 個字節的數據並加上換行符號&字串結尾符號。
8. 同 4 操作，印出整行文字。
9. 關閉檔案。

Result screenshots:



```
root@:/home/team18/Advanced-UNIX-Programming_Student/assignment1 # make
gcc  -O2 -pipe -c assignment1.c -o assignment1.o
gcc -std=c11 -O2 -Wall -o assignment1 assignment1.o
root@:/home/team18/Advanced-UNIX-Programming_Student/assignment1 # ls
Makefile              assignment1           assignment1.c          assignment1.o          sample.txt             try_append_flag.c      try_append_flag.txt
root@:/home/team18/Advanced-UNIX-Programming_Student/assignment1 # cat assignment1.c
#include <stdio.h>
#include <fcntl.h>
#include <unistd.h>
#include<string.h>

// int open(const char *path, int oflag, ...);
// off_t lseek(int fildes, off_t offset, int whence);

int main() {
    char path_to_file[] = "sample.txt";
    char my_buffer[100];
    int student_offset = 14;

    // open the file with flag O_RDWR
    int file_descriptor = open(path_to_file, O_RDWR);

    // read
    lseek(file_descriptor, student_offset, SEEK_SET);
    read(file_descriptor, my_buffer, 8);
    my_buffer[8] = '\n';
    my_buffer[9] = '\0';
    write(STDOUT_FILENO, my_buffer, 9);

    // write
    lseek(file_descriptor, student_offset, SEEK_SET);
    write(file_descriptor, "NTHU student.", strlen("NTHU student."));
    lseek(file_descriptor, 0, SEEK_SET);

    // read
    read(file_descriptor, my_buffer, 27);
    my_buffer[27] = '\n';
    my_buffer[28] = '\0';
    write(STDOUT_FILENO, my_buffer, 28);

    // close the file
    close(file_descriptor);

    return 0;
}
root@:/home/team18/Advanced-UNIX-Programming_Student/assignment1 # cat sample.txt
Hello, I am a student.
root@:/home/team18/Advanced-UNIX-Programming_Student/assignment1 # ./assignment1
student.
Hello, I am a NTHU student.
```