

面向对象程序设计基础作业十一 设计文档

1. 模型部分

a. 功能简述

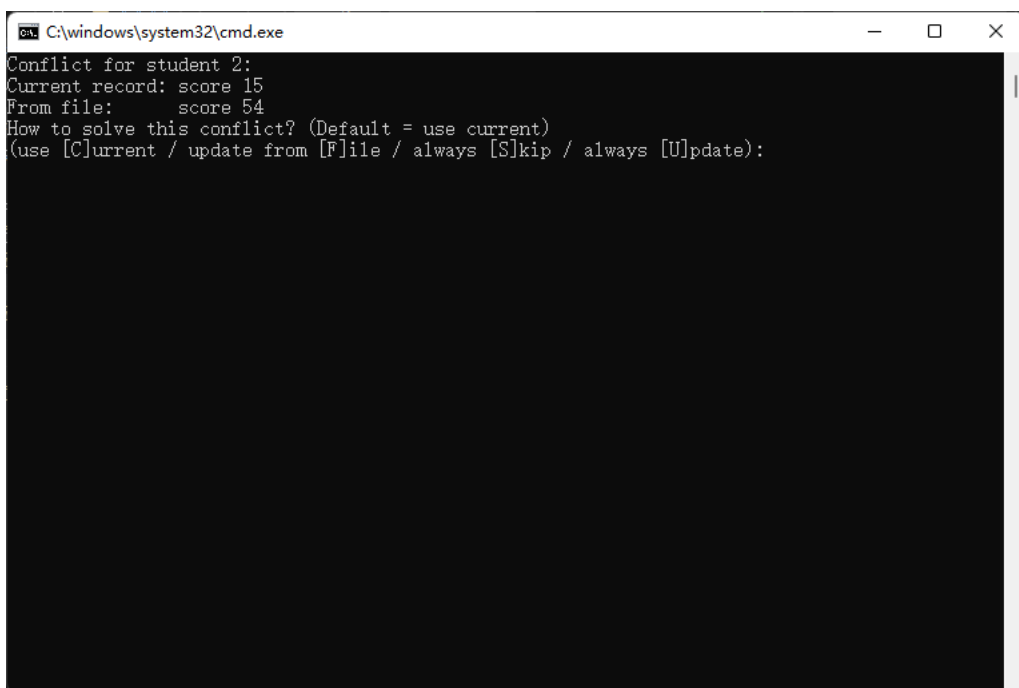
本程序实现了学生成绩管理程序，并支持从文件输入、向文件输出。用户启动程序后，可以不断输入指令完成相应功能。具体功能列表请见下文，或在程序内输入指令码 0 查看。

b. 具体功能说明

i. 从文件读入数据

使用指令 1，并输入文件名，程序会从该文件中读入全部数据。如果这一文件不存在，会提示用户重新输入新的路径。路径格式要求同 C++ 文件要求，文件格式要求为若干整数对，分别对应学号和成绩。

如果文件中含有和目前程序内学号相同的记录，会询问用户如何处理，用户可以跳过该记录或使用文件中的记录覆盖当前记录。同时，如果希望对文件里的每一个冲突都应用统一选择，也可以在此界面进行选择。



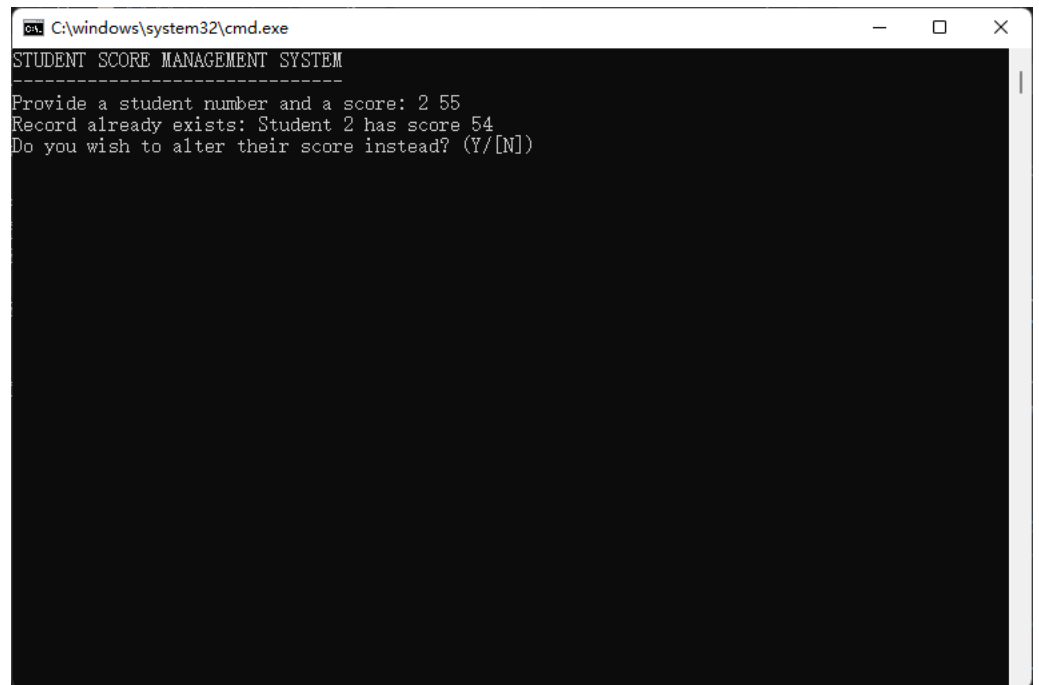
```
C:\windows\system32\cmd.exe
Conflict for student 2:
Current record: score 15
From file:      score 54
How to solve this conflict? (Default = use current)
(use [C]urrent / update from [F]ile / always [S]kip / always [U]pdate):
```

ii. 向文件输出数据

使用指令 8，并输入文件名，程序会在该位置打开一个新文件（如果已有同名文件会删除全部内容），并将当前存储的记录全部存在该文件中，储存格式同输入格式。如果因为某些缘故没能成功打开这一文件，将要求用户更换存储路径。

iii. 添加记录

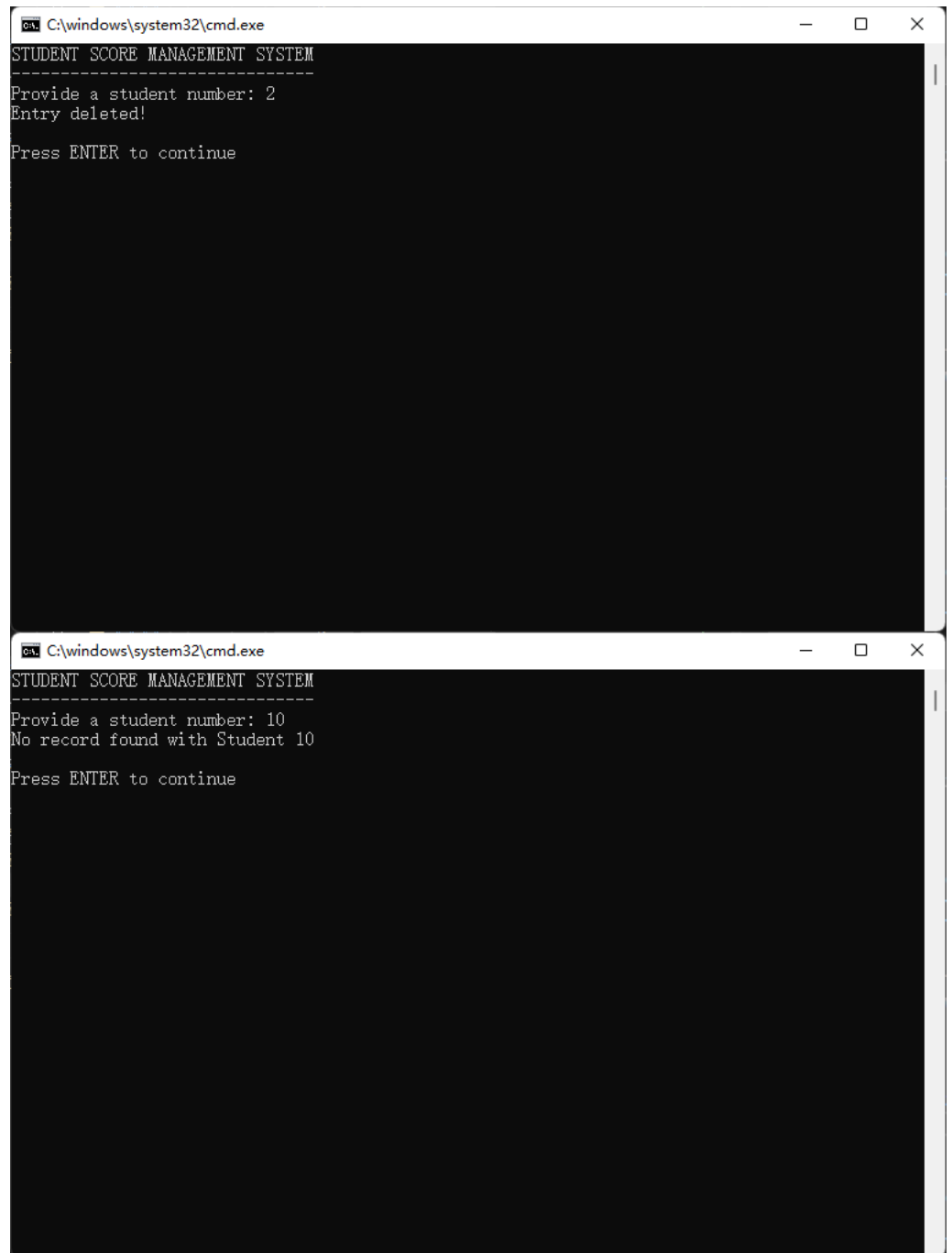
使用指令 2，并输入学号与成绩，程序将把该记录储存进当前存储中。如果用户输入了与当前已有记录相同学号的记录，将会询问用户是否转而修改该记录。



```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a student number and a score: 2 55
Record already exists: Student 2 has score 54
Do you wish to alter their score instead? (Y/[N])
```

iv. 删除记录

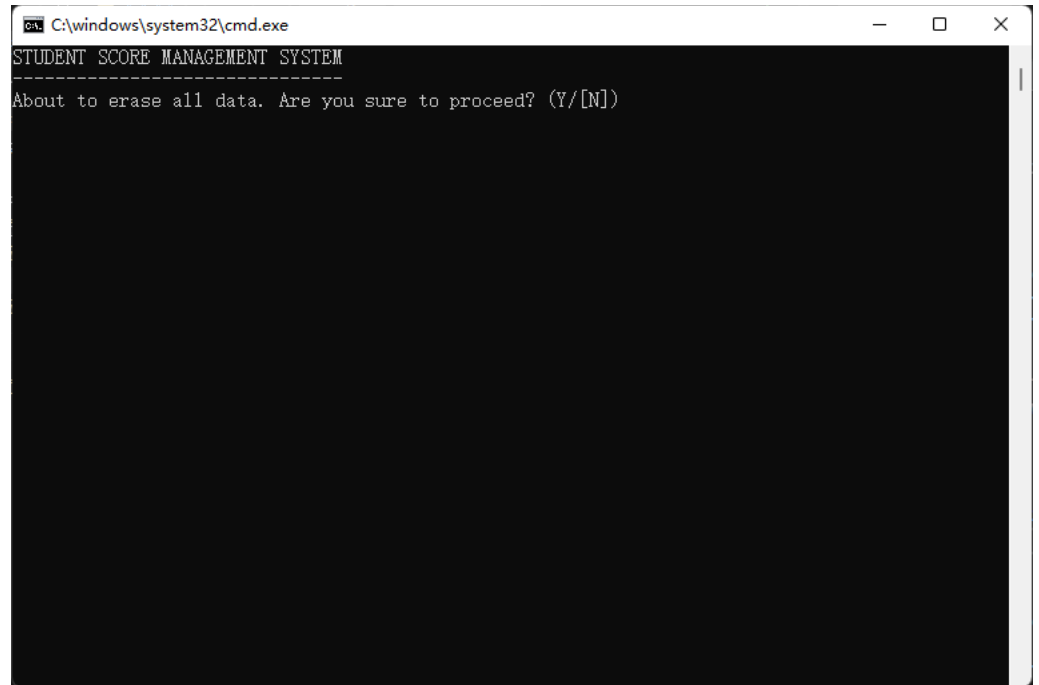
使用指令 3，并输入学号，程序将删除该记录。如果没有找到该学号的记录，将会提示该学号不存在。



```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a student number: 2
Entry deleted!
Press ENTER to continue

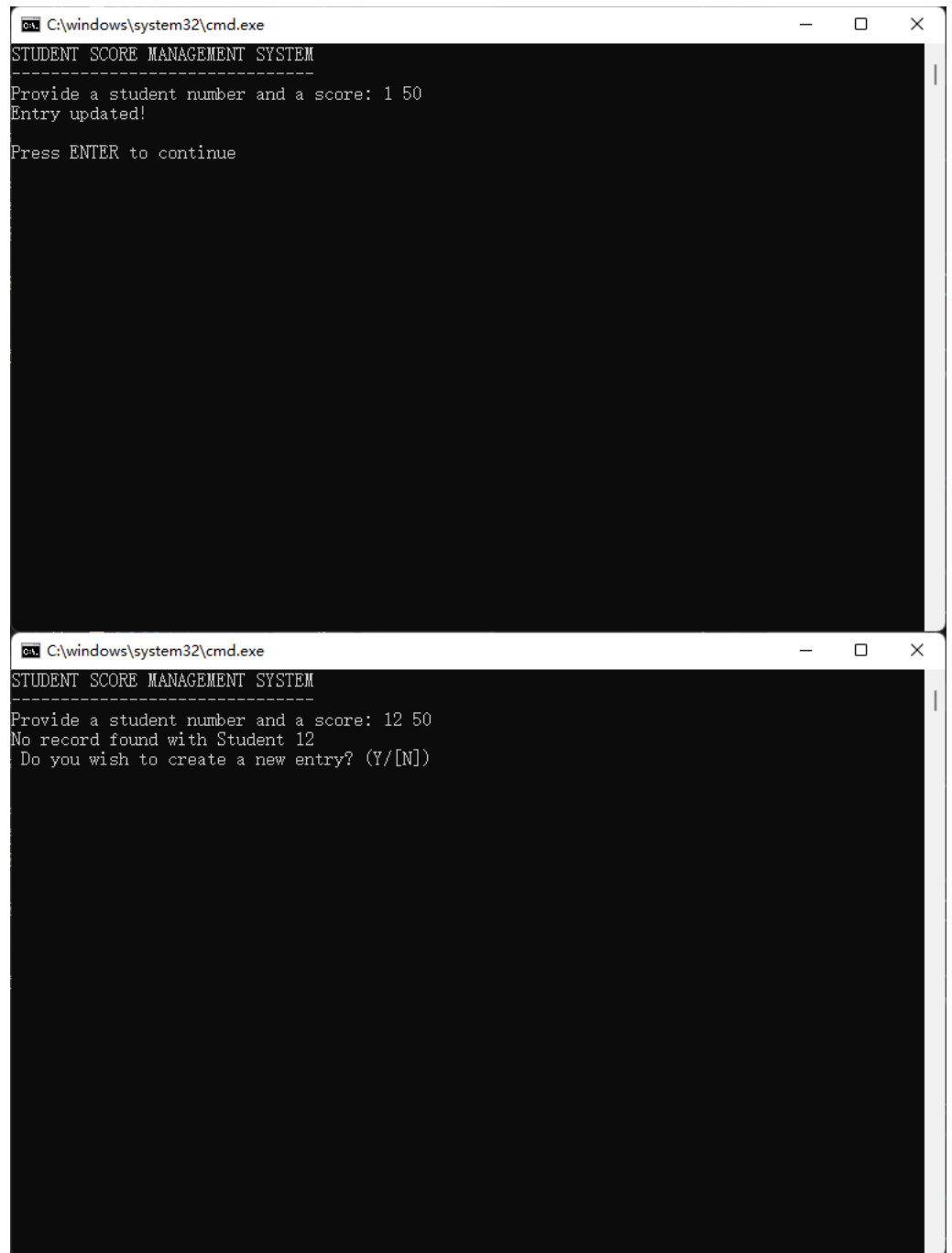
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a student number: 10
No record found with Student 10
Press ENTER to continue
```

使用指令 4，则可以一次性删除所有当前存储的记录。这个操作在执行前，用户需要再次输入 Y 确认。



v. 修改记录

使用指令 5，并输入学号和成绩，程序将把该学号的记录成绩更改为新的成绩。如果没有找到该学号的记录，则会询问用户是否要新增记录。

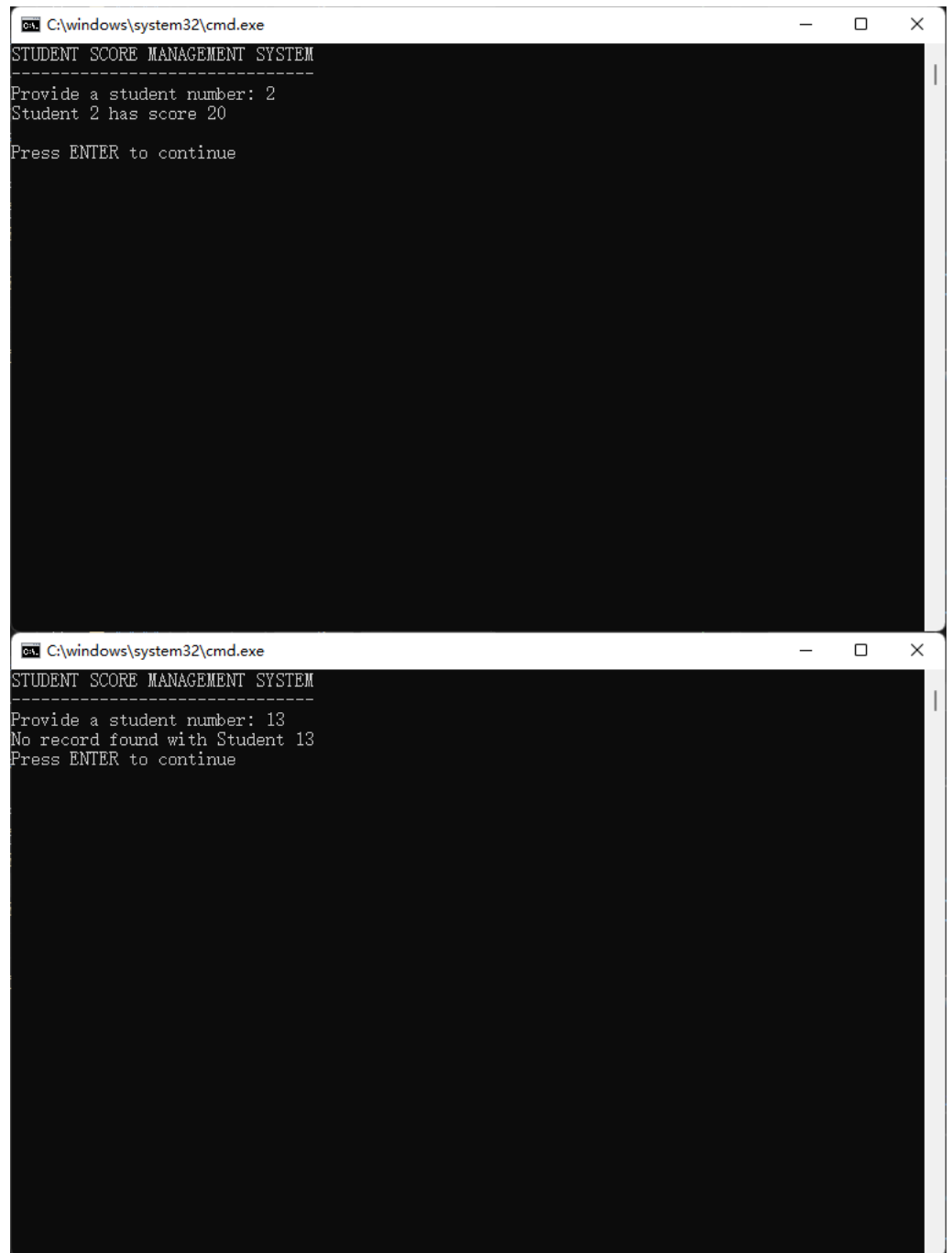


```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a student number and a score: 1 50
Entry updated!
Press ENTER to continue

C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a student number and a score: 12 50
No record found with Student 12
Do you wish to create a new entry? (Y/[N])
```

vi. 查询成绩

使用指令 6，并输入学号，程序将显示该学号的成绩。如果没有找到该学号的记录，则会提示没有该记录。



```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a student number: 2
Student 2 has score 20
Press ENTER to continue

C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a student number: 13
No record found with Student 13
Press ENTER to continue
```

vii. 显示所有记录

使用指令 7，程序会显示所有当前记录。

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
      SHOWING ALL RECORDS
Student No.      Score
1                50
2                20
3                31
12               50
53               4

Press ENTER to continue
```

viii. 帮助界面

使用指令 0，程序会提供一份简要的帮助文档。

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
1 Read in data from a file.
  Should conflicts occur, for each conflict, we will ask you whether to leave the data unmodified or to update it.
  You can also specify the default action at any time.
2 Create a new record.
  If a record exists with that number, we will ask you whether to leave the data unmodified or to update it.
3 Delete a record.
  If such record does not exist, this does nothing.
4 Delete all records. THIS COULD BE DANGEROUS.
  We recommend you save first. We will also do a double-check before actually clearing all data.
5 Modify a record by student's id number.
  If such record does not exist, we will ask you whether to create a new record.
6 Show the score of the student of a given id number.
  We will tell you if such doesn't exist.
7 Show all records.
8 Save all records to a given file.
  Note that this overwrites all data in that file.
  If such file doesn't exist, we will create one first.
-1 Quit the programme.
  We will ask whether you want to save the data.

Press ENTER to continue
```

ix. 退出程序

使用指令-1，程序会尝试退出。退出前，程序会显示所有当前记录，并询问用户是否要保存所有当前记录。若用户希望保存，则会按照 ii. 中的方法要求用户输入路径。

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Quitting the system!

      SHOWING ALL RECORDS
Student No.      Score
1                50
2                20
3                31
12               50
53               4
Do you want to save the records above to external files? ([Y]/N)
```

2. 验证部分

a. 测试数据说明

本测试过程由以下流程依次组成，能够测试上述所有情况。受空间所限，没有将每一项操作后调用指令 7 确认结果正确的截图全部放上来，但测试过程中进行了验证。可以认为，以下测试过程是十余个测试样例的集合。

b. 测试结果

- i. 打开程序，此时程序目录下没有任何 txt 文件。


```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
INPUT A COMMAND(1~8) BELOW
INPUT 0 FOR HELP
INPUT -1 TO QUIT
```

ii. 指令 0, 打开帮助菜单

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
1 Read in data from a file.
  Should conflicts occur, for each conflict, we will ask you whether to leave the data unmodified or to update it.
  You can also specify the default action at any time.
2 Create a new record.
  If a record exists with that number, we will ask you whether to leave the data unmodified or to update it.
3 Delete a record.
  If such record does not exist, this does nothing.
4 Delete all records. THIS COULD BE DANGEROUS.
  We recommend you save first. We will also do a double-check before actually clearing all data.
5 Modify a record by student's id number.
  If such record does not exist, we will ask you whether to create a new record.
6 Show the score of the student of a given id number.
  We will tell you if such doesn't exist.
7 Show all records.
8 Save all records to a given file.
  Note that this overwrites all data in that file.
  If such file doesn't exist, we will create one first.
-1 Quit the programme.
  We will ask whether you want to save the data.

Press ENTER to continue
```

iii. 指令 1, 尝试从 test.txt 文件读入数据 (会失败, 选择输入 CANCEL 中止读入)

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a path from which to read data: test.txt
Error in opening file!
Provide another path from which to read data, or type in CANCEL: CANCEL

Press ENTER to continue
```

- iv. 三次指令 2，添加如下数据：学号 2021011819，成绩 100；学号 2021011820，成绩 95；学号 2021011821，成绩 90。



```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a student number and a score: 2021011819 100
Entry created!
Press ENTER to continue

C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a student number and a score: 2021011820 95
Entry created!
Press ENTER to continue

C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a student number and a score: 2021011821 90
Entry created!
Press ENTER to continue
```

- v. 指令 2，尝试添加如下数据：学号 2021011819，成绩 90（冲突，选择不修改）

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a student number and a score: 2021011819 95
Record already exists: Student 2021011819 has score 100
Do you wish to alter their score instead? (Y/LN)
N
Press ENTER to continue
```

vi. 指令 8, 向 test.txt 写入数据

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a path to which records are to be saved: test.txt
Data written to file!
Press ENTER to continue
```

vii. 指令 7, 显示所有数据

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
      SHOWING ALL RECORDS
Student No.      Score
2021011819       100
2021011820        95
2021011821        90
Press ENTER to continue
```

viii. 指令 6, 查询学号为 2021011819 的数据

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a student number: 2021011819
Student 2021011819 has score 100
Press ENTER to continue
```

- ix. 指令 5，修改学号 2021011819 的数据，新成绩是 95

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a student number and a score: 2021011819 95
Entry updated!
Press ENTER to continue
```

- x. 指令 5，尝试修改学号为 2021011822 的数据，新成绩是 80（无此记录，选择添加新记录）

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a student number and a score: 2021011822 80
No record found with Student 2021011822
Do you wish to create a new entry? (Y/[N])
Y
Entry updated!
Press ENTER to continue
```

- xi. 指令 1, 从 test.txt 中读入数据 (学号为 2021011819 的数据发生了冲突, 选择覆盖)

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a path from which to read data: test.txt
Conflict for student 2021011819:
Current record: score 95
From file:      score 100
How to solve this conflict? (Default = use current)
(use [C]urrent / update from [F]ile / always [S]kip / always [U]pdate): F
Record updated!
Data read from file!
Press ENTER to continue
```

- xii. 指令 3, 尝试删除学号为 2021000000 的数据 (不存在此数据)

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a student number: 2021000000
No record found with Student 2021000000
Press ENTER to continue
```

- xiii. 指令 3, 删除学号为 2021011820 的数据

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a student number: 2021011820
Entry deleted!
Press ENTER to continue
```

xiv. 指令 7, 显示所有数据

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
      SHOWING ALL RECORDS
Student No.      Score
2021011819       100
2021011821        90
2021011822        80
Press ENTER to continue
```

xv. 指令 4, 删除所有数据

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
About to erase all data. Are you sure to proceed? (Y/[N])
Y
All data erased!
Press ENTER to continue
```

xvi. 指令 1, 从 test.txt 中读入数据 (完全正常的读入)

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Provide a path from which to read data: test.txt
Data read from file!
Press ENTER to continue
```

xvii. 指令 7, 显示所有数据

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
      SHOWING ALL RECORDS
Student No.      Score
2021011819       100
2021011820       95
2021011821       90
Press ENTER to continue
```

xviii. 指令-1, 希望退出程序, 选择不保存

```
C:\windows\system32\cmd.exe
STUDENT SCORE MANAGEMENT SYSTEM
-----
Quitting the system!

      SHOWING ALL RECORDS
Student No.      Score
2021011819       100
2021011820       95
2021011821       90
Do you want to save the records above to external files? ([Y]/N)N
Thanks for using Student Management System!
Press ENTER to quit...
```