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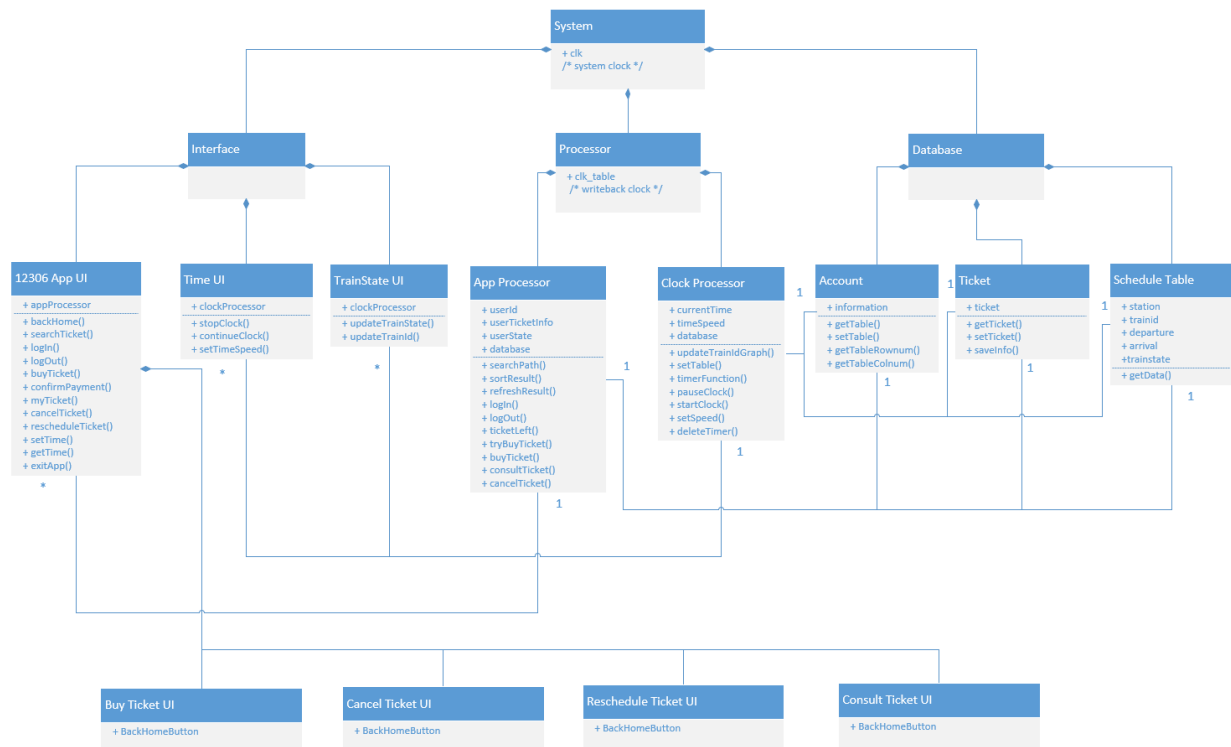
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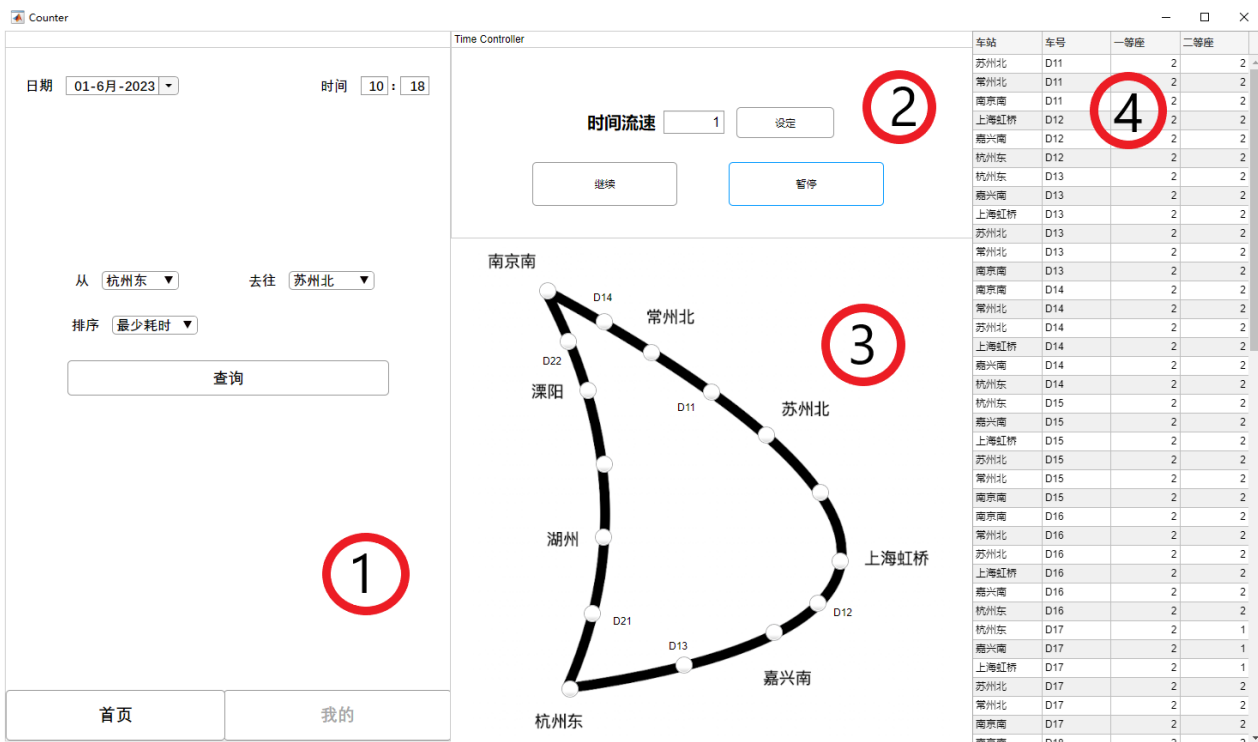
System Architecture



Software Specification

S0 Basic Introduction

In development folder, open `main.m` and run it. The system will begin to run. At beginning, there will be a UI show up as picture below.



There are 4 section in the UI. The **1** section is the 12306 main UI. The **2** section is time controller. The **3** section is train location monitor and **4** monitor is train seat left monitor. **2**, **3**, **4** are all backend UI.

S1 Main Panel

日期

14-4月-2023 ▼

时间

00:00

从

杭州东 ▼

去往

苏州北 ▼

排序

最少耗时 ▼

查询

首页

我的

S1.1 Press DatePicker

- Date will turn to value user pick.

S1.2 Press DropDown

- DropDown value will become the one that user chooses.

S1.3 Press 查询

- Process will use time now, departure station, arrival station and date to search available routines.
- And will sort the result and display it in search panel.
- Finally, current panel will be invisible and search panel will be visible.

S1.4 Press 我的

- Current panel will be invisible and 我的 Panel will be visible.

S2 Log In

用户

登陆

首页

我的

S2.1 Edit EditField

- Type in a number in the EditField to change its value, the limit of EditField is set to `[1, +inf]` .

S2.2 Press 登陆

- Process will check whether there is record of the user id in EditField, if not, a new record of the new user ID will be added to database.
- Current panel will be invisible and the after-login 我的 will be visible.
- The after-login 我的 panel will show the login ID.

S2.3 Press 首页

- Current panel will be invisible and 首页 panel will be visible.

S3 Mine Panel After Log In

用户 114514 已登录

登出

本人车票

首页

我的

S3.1 Press 登出

- Log out function will be triggered.
- Current panel will be invisible and the before-login 我的 will be visible.

S3.2 Press 本人车票

- Process will check whether logged in and whether the has a ticket. If not, a warning panel will jump out like below.



- If there is a ticket in the account, current panel will be invisible and the ticket panel will be visible.
- Information about the ticket will be set in the ticket panel.

S3.3 Press 首页

- Current panel will be invisible and 首页 (Home) panel will be visible.

S4 Search Result

[<返回](#)**杭州东**

需转乘：无

苏州北

始 11:33

总耗时：01H27M

终 13:00

价格：3

D15

一等座：2

二等座：2

购买

杭州东

需转乘：无

苏州北

始 13:03

总耗时：01H27M

终 14:30

价格：3

D17

一等座：2

二等座：1

购买

杭州东

需转乘：南京南

苏州北

始 11:33

总耗时：02H27M

终 14:00

价格：5

D23

D18

一等座：2

二等座：2

购买

杭州东

需转乘：南京南

苏州北

始 11:03

总耗时：02H57M

终 14:00

价格：6

G21

D18

一等座：2

二等座：2

购买

S4.1 Press [返回](#)

- Current panel will be invisible and the main panel will be visible.

S4.2 Press 购买

- System will remember which 购买 is pushed and get the detailed information on the ticket user choose as well as set these information in payment panel.
- Current panel will be invisible and the payment panel will be visible.
- The payment clock countdown is set to 15 minutes.

S5 Pay

pay

购买车票

支付剩余时间: 15 分钟

价格:¥ 3

始发站: 杭州东

发车时间: 10:03

到达站: 苏州北

到达时间: 11:30

是否换乘: 无

座位类型

二等座 ▼

返回首页

确定

S5.1 DropDown

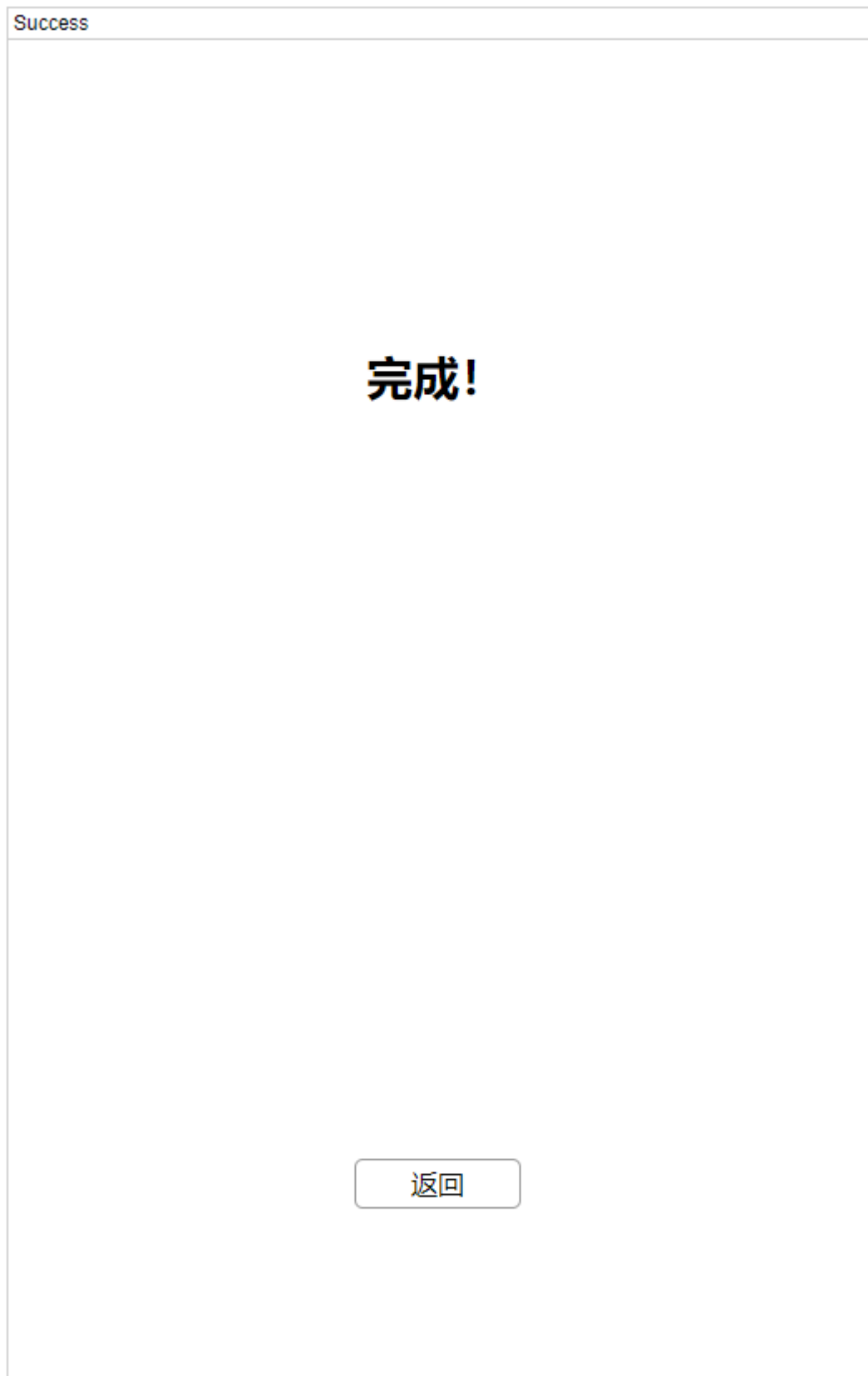
- The DropDown value will be set to what user choose.

S5.2 Press 返回首页

- Current panel will be invisible and the main panel will be visible.

S5.3 Press 确定

- Process will buy the ticket according to the information by triggering `buy_ticket()` , and if the function returns 1(success), a success panel will show up as above.
- If the function returns 0(error), corresponding msgbox will jump out.



S6 My Ticket

ticket

用户 114514 已登录

价格:¥ 3

始发站: 杭州东

发车时间: 11:33

到达站: 苏州北

到达时间: 13:00

座位类型: 2

是否中转: 否

上车

<返回

改签

退票

S6.1 Press 返回

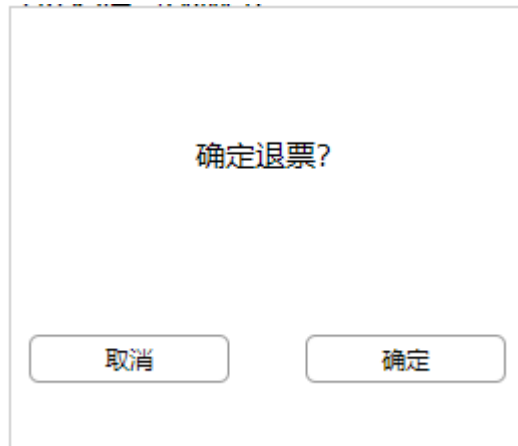
- Current panel will be invisible and Mine Panel will be visible.

S6.2 Press 改签

- The reschedule panel will be visible and current panel will be invisible.

S6.3 Press 退票

- After pushing 退票 , a reconfirm panel will be visible like picture below.



S6.3.1 Press 取消

- The reconfirm panel will be invisible.

S6.3.2 Press 确定

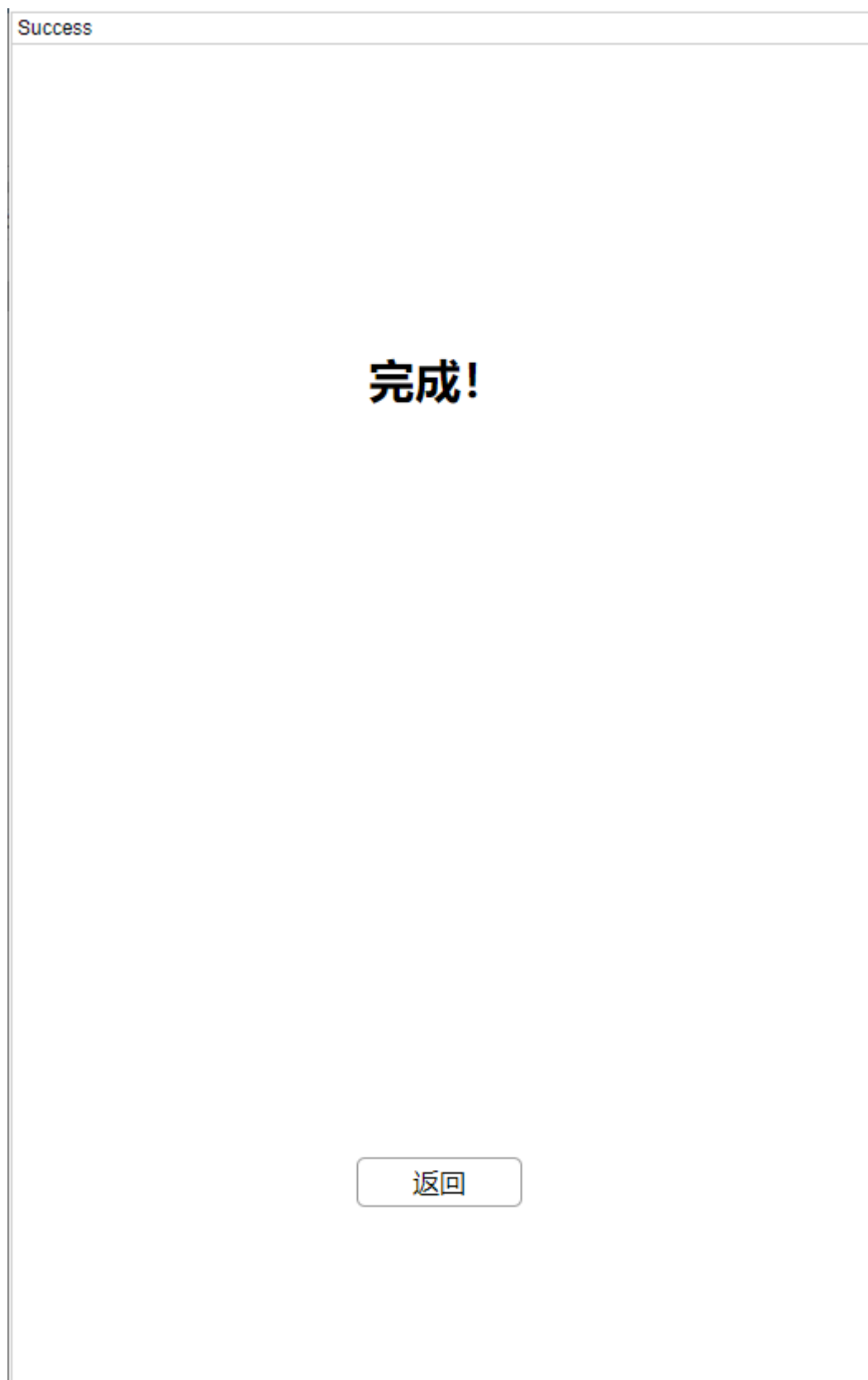
- Will be illustrated in S6.5.

S6.4 Unpress 上车

- The button value will be changed and will affect `timerFunction()` when triggered.

S6.5 Press 确定 in S6.3.2

- As S6.3.2 triggered, process will check whether there is a ticket, if so process will cancel the ticket and release seats to corresponding train.
- If the function returns 0(error), corresponding msgbox will jump out.



S7 Reschedule Ticket

S7.1 改签 button

- Ticket panel will be invisible and reschedule panel like below will be visible.

reschedule

<返回

从

杭州东 ▼

去往

苏州北 ▼

排序

最少耗时 ▼

查询

S7.2 Press 返回

- Current panel will be invisible and Mine panel will be visible.

S7.3 Press 查询

- Similar to main page, user can choose the departure station, arrival station and sorting way.
- User can click the button to search available ticket.

reschedule

<返回

杭州东

始 10:03

D13

一等座: 2

需转乘: 无

总耗时: 01H27M

价格: 3

二等座: 1

苏州北

终 11:30

购买

杭州东

始 11:33

D15

一等座: 2

需转乘: 无

总耗时: 01H27M

价格: 3

二等座: 2

苏州北

终 13:00

购买

杭州东

始 13:03

D17

一等座: 2

需转乘: 无

总耗时: 01H27M

价格: 3

二等座: 2

苏州北

终 14:30

购买

杭州东

始 10:03

D21

一等座: 2

需转乘: 南京南

总耗时: 02H27M

价格: 5

二等座: 1

苏州北

终 12:30

D16

购买

S7.4 Press 返回

- Current panel will be invisible and Main page will be visible.

S7.5 Press 购买

- Still similar to buying ticket, user can press different 购买 to buy tickets. System will remember which 购买 is pushed and get the detailed information on the ticket user choose as well as set these information in payment panel.

reschedule

购买车票

请补齐差价

差价:¥ 0

始发站: 杭州东

发车时间: 11:33

到达站: 苏州北

到达时间: 13:00

是否换乘: 无

座位类型

二等座 ▼
一等座
二等座

返回

确定

S7.6 DropDown

- The DropDown value will be set to what user choose.

S7.7 Press 返回

- Current panel will be invisible and the main panel will be visible.

S7.8 Press 确定

- Process will buy the ticket according to the information by triggering `buy_ticket()` , and if the function returns 1(success), a success panel will show up as above.
- If the function returns 0(error), corresponding msgbox will jump out.



S7.9 Press 返回

- Current panel will be invisible and the main panel will be visible.

S8 Time Controller

Time Controller

时间流速

20

设定

继续

暂停

S8.1 Type in editfield and press 设定

- Time speed will be changed by triggering `setSpeed()` .

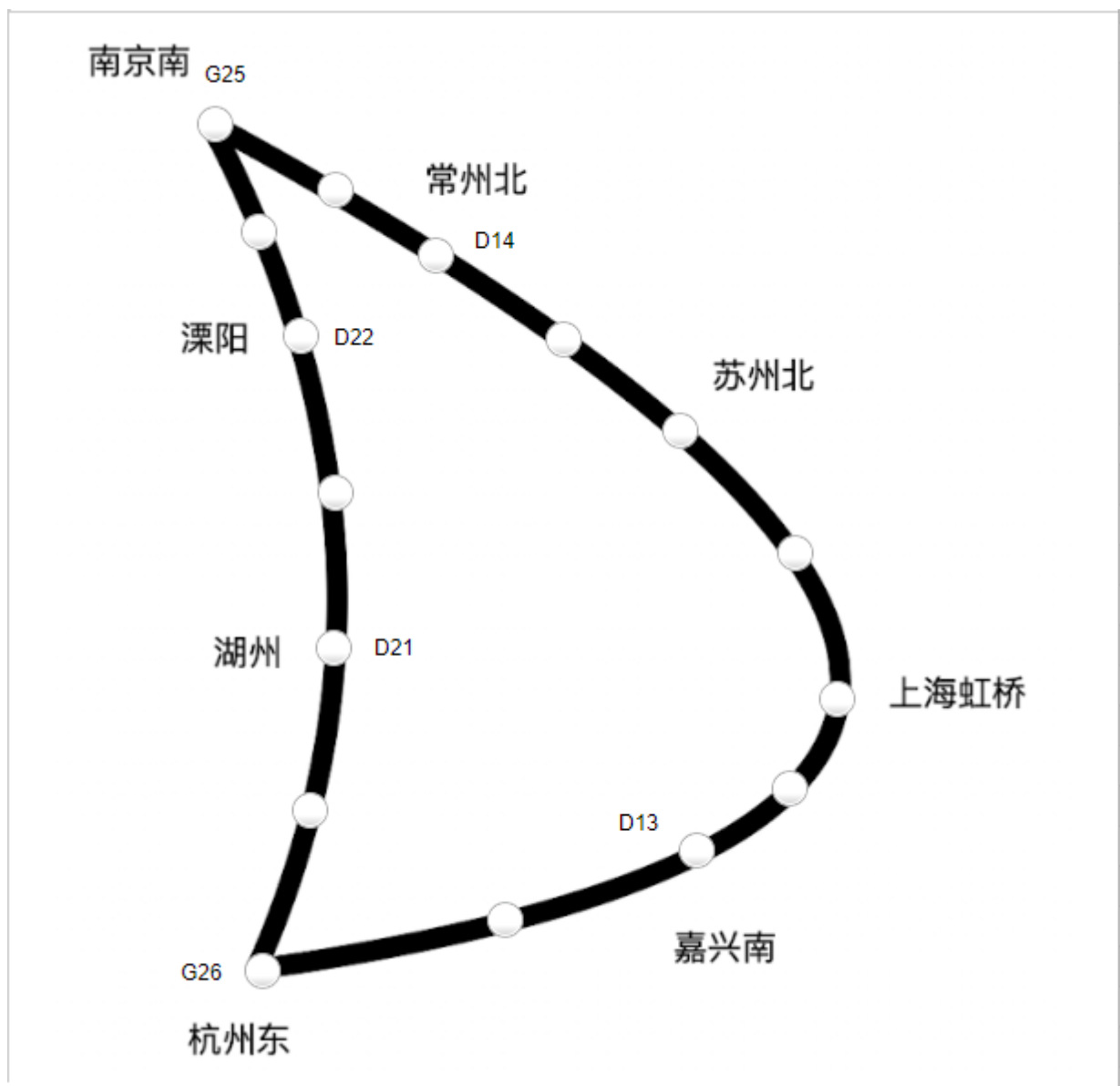
S8.2 Press 继续

- Continue time when clock is paused. In other case there won't be any respond. System will check the clock running status.

S8.3 Press 暂停

- Pause time when clock is running. In other case there won't be any respond. System will check the clock running status.

S9 Trainstate Monitor



S9.1 System TimerFunction

- As Time goes, process will check which should be move according to its arrival and departure.
- The movement speed is corresponding to system time speed because the update function is in `timerFunction()`.

车站	车号	一等座	二等座
苏州北	D11	2	2
常州北	D11	2	2
南京南	D11	2	2
上海虹桥	D12	2	2
嘉兴南	D12	2	2
杭州东	D12	2	2
杭州东	D13	2	2
嘉兴南	D13	2	2
上海虹桥	D13	2	2
苏州北	D13	2	2
常州北	D13	2	2
南京南	D13	2	2
南京南	D14	2	2
常州北	D14	2	2
苏州北	D14	2	2
上海虹桥	D14	2	2
嘉兴南	D14	2	2
杭州东	D14	2	2
杭州东	D15	2	2
嘉兴南	D15	2	2
上海虹桥	D15	2	2
苏州北	D15	2	2
常州北	D15	2	2
南京南	D15	2	2
南京南	D16	2	2
常州北	D16	2	2
苏州北	D16	2	2
上海虹桥	D16	2	2
嘉兴南	D16	2	2
杭州东	D16	2	2
杭州东	D17	2	2
嘉兴南	D17	2	2
上海虹桥	D17	2	2
苏州北	D17	2	2
常州北	D17	2	2
南京南	D17	2	2
南京南	D18	2	2

S9.2 Writeback TimerFunction

- Process will merge `schedule.csv` and `ticket.csv` and create a new table and display it.
- The write back timer function triggers every 2 seconds.(Doesn't have GUI to change)

S10 Concurrent Buy Ticket

S10.1 Windows

- Run `multi_main.m` which is the multi version of 12306 that has same instance of database but different instance of other class.