Test Case
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Instructions:

1. Open the program and print the welcome and Instruction for user:

```
Welcome to Rugters garage system!


Instructions:
-----------------------------------------------------------
option 1 : Printout all cars' information in the garage.
option 2 : Allow a car to enter.
option 3 : Advance time by 30 minutes.
option 4 : Search car.
Choose your option:
```

2. Test the print function if there is no car in the garage. Every time the system print out the information of garage, it will also print the current time.

```
Choose your option:
1
Time: 6:00 Car in the garage:
-----------------------------------------------------------
Enter-time  Maker      Model      Color     License  Exit-time  Total-Charge

Instructions:
-----------------------------------------------------------
option 1 : Printout all cars' information in the garage.
option 2 : Allow a car to enter.
option 3 : Advance time by 30 minutes.
option 4 : Search car.
Choose your option:
```

3. Test the function of enter car:

User need to input hour and minute separately. The first input is

Case a).12, 12, A1, M1, m1, c1

```
Enter Time - hour(6~24 hour): 12
Enter Time - min(0~60 min): 12
License Number: A1
Maker: M1
Model: m1
Color: c1
```

Output it to check the information:

```
Time: 6:00 Car in the garage:
-----------------------------------------------------------
Enter-time  Maker      Model      Color     License  Exit-time  Total-Charge
   12:12    M1         m1         c1        A1        16:52       $6
```

4. Test whether the clock time can be record correctly in form of "XX:XX".

Case b). 10, 6, A2, M1, m1, c1

```
Enter Time - hour(6~24 hour): 10
Enter Time - min(0~60 min): 6
License Number: A2
Maker: M1
Model: m1
Color: c1
```

Case c). 7, 06, A000003, M1, m1, c1

```
Enter Time - hour(6~24 hour): 7
Enter Time - min(0~60 min): 06
License Number: A000003
Maker: M1
Model: m1
Color: c1
```

Case 4). 08, 59, A4, M1, m1, c1

```
Enter Time - hour(6~24 hour): 08
Enter Time - min(0~60 min): 59
License Number: A4
Maker: M1
Model: m1
Color: c1
```

…

…

And print the current garage information. We can find the system can convert "0X" and "X" into the correct form "XX".

```
Time: 6:00 Car in the garage:
-------------------------------------------------------------
Enter-time  Maker    Model    Color    License   Exit-time   Total-Charge
   12:12    M1       m1       c1       A1         16:52        $6
   10:06    M1       m1       c1       A2         16:25        $14
   07:06    M1       m1       c1       A000003    11:45        $20
   08:59    M1       m1       c1       A4         14:19        $27
   09:09    M1       M1       c1       A5         12:44        $32
   12:12    m1       c1       c1       M1         15:39        $37
   12:00    M1       m1       c2       A7         16:24        $43
   12:00    M2       m2       c1       A8         21:58        $53
   23:30    M3       m1       c2       A9         24:00        $57
   23:59    M1       m1       c1       A10        24:00        $61
```

5. Calculate the total fee:

(I also set that when the stay time~N(5,2) is smaller than 0, the system will set it 1/60 automatically,which is 1 minute.)

in	out	Stay Time	Individual Fee	Total
12:12	16:52	4 hours 30 mins (3<time<9)	6	6
10:06	16:25	6 hours 19 mins	8	14
07:06	11:45	4 hours 39 mins	6	20
08:59	14:19	5 hours 18 (mins_exit < mins_enter)	7	27(**total fee is correct**)
…	…		…	43
12:00	21:58	9 hours 58 mins(time > 9)	10	53(increased by 10)
…	…		…	57
23:59	24:00	1 min(time<3, when time beyond 24:00, the car should be forced to quit)	4	61(increased by 4)

6. Search System interface:

   This is all the car in the system:

```
Time: 6:00 Car in the garage:
-------------------------------------------------------------
Enter-time  Maker    Model    Color    License   Exit-time  Total-Charge
   12:12    M1       m1       c1       A1          16:52       $6
   10:06    M1       m1       c1       A2          16:25       $14
   07:06    M1       m1       c1       A000003     11:45       $20
   08:59    M1       m1       c1       A4          14:19       $27
   09:09    M1       M1       c1       A5          12:44       $32
   12:12    m1       c1       c1       M1          15:39       $37
   12:00    M1       m1       c2       A7          16:24       $43
   12:00    M2       m2       c1       A8          21:58       $53
   23:30    M3       m1       c2       A9          24:00       $57
   23:59    M1       m1       c1       A10         24:00       $61
```

   This is the interface of the system

```
4
Search target cars in the garage according to:.
------------------------------------------------------------
option 1 : single criteria.
option 2 : Multi criteria -- AND.
option 3 : Multi criteria -- OR.
```

7. Search System for single search:
   a) Find the car with Model == m2

```
Single criteria. Choose your criteria:.
---------------------------------------------------
option 1 : Maker.
option 2 : Model.
option 3 : Color.
option 4 : License Number.
2
Input your criteria: m2
M2           m2           c1        A8
---------------------------------------------------
All Car has been chosen.
```

Correct.

b) Find the car with License number = A7

```
Single criteria. Choose your criteria:.
---------------------------------------------------
option 1 : Maker.
option 2 : Model.
option 3 : Color.
option 4 : License Number.
4
Input your criteria: A7
M1           m1           c2        A7
---------------------------------------------------
All Car has been chosen.
```

Correct.

c) Find the car with Maker == M1. Supposed to have 7 which are chosen

```
Single criteria. Choose your criteria:.
---------------------------------------------------
option 1 : Maker.
option 2 : Model.
option 3 : Color.
option 4 : License Number.
1
Input your criteria: M1
M1           m1           c1        A1
M1           m1           c1        A2
M1           m1           c1        A000003
M1           m1           c1        A4
M1           M1           c1        A5
M1           m1           c2        A7
M1           m1           c1        A10
---------------------------------------------------
All Car has been chosen
```

Correct.

8. Extra credit-----And

We assume the use just need the simplest logic expression(which doesn't contain brace"()" and no mixed using of "AND" and "OR")

a) Maker == M1 and license number == A1 (intersection of 2 criteria)

```
Multi criteria AND.
-------------------------------------------------------------
option 1 : Maker.
option 2 : Model.
option 3 : Color.
option 4 : License Number.
option 5 : Finished and print.
Choose your feature: 1
Choose your variable: M1
Choose your feature: 4
Choose your variable: A1
Choose your feature: 5

-------------------------------------------------------------
M1          m1          c1          A1

-------------------------------------------------------------
```

b) Maker == M2 and Model == m2 and license number ==A8(more than 2 criteria)

```
Multi criteria AND.
-------------------------------------------------------------
option 1 : Maker.
option 2 : Model.
option 3 : Color.
option 4 : License Number.
option 5 : Finished and print.
Choose your feature: 1
Choose your variable: M2
Choose your feature: 2
Choose your variable: m2
Choose your feature: 4
Choose your variable: A8
Choose your feature: 5

-------------------------------------------------------------
M2          m2          c1          A8

-------------------------------------------------------------
All Car has been choosen
```

c) Maker == M1 and license number == No(no intersection)

```
Multi criteria AND.
----------------------------------------------------------
option 1 : Maker.
option 2 : Model.
option 3 : Color.
option 4 : License Number.
option 5 : Finished and print.
Choose your feature: 1
Choose your variable: M1
Choose your feature: 4
Choose your variable: No
Choose your feature: 5
----------------------------------------------------------
----------------------------------------------------------
All Car has been choosen
```

d) Maker ==M1 and Maker == M2(repeated criteria)

```
Multi criteria AND.
----------------------------------------------------------
option 1 : Maker.
option 2 : Model.
option 3 : Color.
option 4 : License Number.
option 5 : Finished and print.
Choose your feature: 1
Choose your variable: M1
Choose your feature: 1
Choose your variable: M2
Choose your feature: 5
----------------------------------------------------------
----------------------------------------------------------
All Car has been choosen
```

9. Extra credit-----OR
   a) Maker == M3 or license number == A10 (regular one)

```
3
Multi criteria OR.
----------------------------------------------------------------
option 1 : Maker.
option 2 : Model.
option 3 : Color.
option 4 : License Number.
option 5 : Finished and print.
Choose your feature: 1
Choose your variable: M3
Choose your feature: 4
Choose your variable: A10
Choose your feature: 5
----------------------------------------------------------------
M3            m1            c2            A9
M1            m1            c1            A10
----------------------------------------------------------------
All Car has been choosen
```

b) Maker == M3 or Model == m2 or license number == No (more than 2 conditions)

```
3
Multi criteria OR.
----------------------------------------------------------------
option 1 : Maker.
option 2 : Model.
option 3 : Color.
option 4 : License Number.
option 5 : Finished and print.
Choose your feature: 1
Choose your variable: M3
Choose your feature: 2
Choose your variable: m2
Choose your feature: 4
Choose your variable: No
Choose your feature: 5
----------------------------------------------------------------
M2            m2            c1            A8
M3            m1            c2            A9
----------------------------------------------------------------
```

c) Color == c2 or license number == A9 (make sure when the same object is satisfied with more than one conditions won't be added more than one times)

```
Multi criteria OR.
-----------------------------------------------------------------
option 1 : Maker.
option 2 : Model.
option 3 : Color.
option 4 : License Number.
option 5 : Finished and print.
Choose your feature: 3
Choose your variable: c2
Choose your feature: 4
Choose your variable: A9
Choose your feature: 5
-----------------------------------------------------------------
M1          m1          c2          A7
M3          m1          c2          A9
-----------------------------------------------------------------
All Car has been choosen
```

d) Model == m2(only one condition)

```
Multi criteria OR.
-----------------------------------------------------------------
option 1 : Maker.
option 2 : Model.
option 3 : Color.
option 4 : License Number.
option 5 : Finished and print.
Choose your feature: 2
Choose your variable: m2
Choose your feature: 5
-----------------------------------------------------------------
M2          m2          c1          A8
-----------------------------------------------------------------
```

e) Maker == M2 or Maker == M3 (the same kind of criteria)

```
Multi criteria OR.
-----------------------------------------------------------
option 1 : Maker.
option 2 : Model.
option 3 : Color.
option 4 : License Number.
option 5 : Finished and print.
Choose your feature: 1
Choose your variable: M2
Choose your feature: 1
Choose your variable: M3
Choose your feature: 5

-----------------------------------------------------------
M3          sad         asd         M2
M2          m2          c1          A8
M3          m1          c2          A9
-----------------------------------------------------------
All Car has been choosen
```

10. Test advance time

Every time we advance time, the system will give out the current time and cars which exited in the past 30 minutes:

6:00 (Initial information):

```
1
Time: 6:00 Car in the garage:
-------------------------------------------------------------------------
Enter-time  Maker   Model     Color     License   Exit-time   Total-Charge
  12:12     M1      m1        c1        A1          16:52        $6
  10:06     M1      m1        c1        A2          16:25        $14
  07:06     M1      m1        c1        A000003     11:45        $20
  08:59     M1      m1        c1        A4          14:19        $27
  09:09     M1      M1        c1        A5          12:44        $32
  12:12     m1      c1        c1        M1          15:39        $37
  12:00     M1      m1        c2        A7          16:24        $43
  12:00     M2      m2        c1        A8          21:58        $53
  23:30     M3      m1        c2        A9          24:00        $57
  23:59     M1      m1        c1        A10         24:00        $61
```

6:30-11:30 no car exit (eliminate the screenshot)

```
3
Time: 6:30 Cars that exited garage in the past 30 minutes:
--------------------------------------------------------------
Enter-time  Maker      Model      Color     License   Exit-time   Total-Charge
```

12:00- 1 car, total fee =$6

```
Time: 12:00 Cars that exited garage in the past 30 minutes:
--------------------------------------------------------------
Enter-time  Maker      Model      Color     License   Exit-time   Total-Charge
  07:06     M1         m1         c1        A3          11:45        $6
```

13:00 - 1 car, total fee = $5

```
3
Time: 13:00 Cars that exited garage in the past 30 minutes:
------------------------------------------------------------
Enter-time  Maker      Model       Color     License  Exit-time  Total-Charge
  09:09     M1         M1          c1        A5         12:44       $5
```

14:30 – 1 car, total fee = $7

```
3
Time: 14:30 Cars that exited garage in the past 30 minutes:
------------------------------------------------------------
Enter-time  Maker      Model       Color     License  Exit-time  Total-Charge
  08:59     M1         m1          c1        A4         14:19       $7
```

16:00 – 1 car, total fee = $5

```
3
Time: 16:00 Cars that exited garage in the past 30 minutes:
------------------------------------------------------------
Enter-time  Maker      Model       Color     License  Exit-time  Total-Charge
  12:12     M1         m1          c1        A2         15:39       $5
```

16:30 – 1 car, total fee = $8

```
3
Time: 16:30 Cars that exited garage in the past 30 minutes:
------------------------------------------------------------
Enter-time  Maker      Model       Color     License  Exit-time  Total-Charge
  10:06     m1         c1          c1        M1         16:25       $8
```

17:00 – 1 car, total fee = $6

```
Time: 17:00 Cars that exited garage in the past 30 minutes:
------------------------------------------------------------
Enter-time  Maker      Model       Color     License  Exit-time  Total-Charge
  12:12     M1         m1          c1        A1         16:52       $6
```

17:30 – 1 car, total fee = $6

```
Time: 17:30 Cars that exited garage in the past 30 minutes:
------------------------------------------------------------
Enter-time  Maker      Model       Color     License  Exit-time  Total-Charge
  12:00     M1         m1          c2        A7         16:24       $6
```

22:30 – 1 car, total fee = $10

```
3
Time: 22:00 Cars that exited garage in the past 30 minutes:
------------------------------------------------------------
Enter-time  Maker      Model       Color     License  Exit-time  Total-Charge
  12:00     M2         m2          c1        A8         21:58       $10
```

24:00 – 2 car, total fee = $8   (more than one car exit)

```
Time: 24:00 Cars that exited garage in the past 30 minutes:
-------------------------------------------------------------
Enter-time  Maker      Model      Color     License  Exit-time  Total-Charge
   23:30    M3         m1         c2        A9         24:00        $4
   23:59    M1         m1         c1        A10        24:00        $8


-------------------------------------------------------------
Rutgers Garage is closed after 24:00. Good night!
Program ended with exit code: 0
```

Check the initial total charge with the sum of each:

6 +5+7+5+8+6+6+10+8 = $61

After 24:00 hour the system will close automatically.

```
-------------------------------------------------------------------
Rutgers Garage is closed after 24:00. Good night!
Program ended with exit code: 0
```