The public test of Task 8 is:

```
TuringTape t(-1);
cout<<t.moveLeft();
for (int i=0;i<10;i++) {
     cout<<t.moveRight();
     t.setContent(i);
}
for (int i=0;i<10;i++) {
     cout<<t.moveLeft();
     cout<<t.getContent();
}
DenseTuringMachine d(-1,-1);
TuringMachineState s1(1,2,3,4,"->");
d.add(s1);
TuringMachineState s2(5,6,7,8,"<-");
d.add(s2);
cout << *d.find(1,2);
cout << *d.find(5,6)<<endl;
cout << (d.find(1,3)==NULL)<<endl;
vector<TuringMachineState> vec=*d.getAll();
sort(vec.begin(),vec.end(),compareState);
for (auto s: vec) cout << s;
MenuSystem m;
m.menu();
```

Where:

```
bool compareState(TuringMachineState s1, TuringMachineState
s2) {
     return
(s1.getCurrentState()<s2.getCurrentState())||(s1.getCurrentSta
te()==s2.getCurrentState())&&s1.getCurrentContent()<s2.getCurr
entContent();
}
```

When the input is:

```
-1
1
-1 -1
3
0 0 1 1 ->
3
0 1 0 0 <-
3
1 0 2 1 ->
3
2 0 0 0 <-
5
5
6
```

5
-1
6
q

The expected output is (the input above is inserted below in red to make it clearer – the output is not expected to contain it):
011111111111817161514131211100012 3 4 ->5 6 7 8 <-
1
1 2 3 4 ->5 6 7 8 <-
How long should the tape be?
-1
1. Create dense Turing machine
2. Create sparse Turing machine
3. Add state to Turing machine
4. Compact Turing machine
5. Execute Turing machine
6. Output current information
Write q or Q to quit
Enter Option
1
What is the maximum state and what is the maximum content?
-1 -1
1. Create dense Turing machine
2. Create sparse Turing machine
3. Add state to Turing machine
4. Compact Turing machine
5. Execute Turing machine
6. Output current information
Write q or Q to quit
Enter Option
3
What state do you wish to add?
0 0 1 1 ->
1. Create dense Turing machine
2. Create sparse Turing machine
3. Add state to Turing machine
4. Compact Turing machine
5. Execute Turing machine
6. Output current information
Write q or Q to quit
Enter Option
3
What state do you wish to add?
0 1 0 0 <-
1. Create dense Turing machine
2. Create sparse Turing machine

3. Add state to Turing machine
4. Compact Turing machine
5. Execute Turing machine
6. Output current information
Write q or Q to quit
Enter Option
3
What state do you wish to add?
1 0 2 1 ->
1. Create dense Turing machine
2. Create sparse Turing machine
3. Add state to Turing machine
4. Compact Turing machine
5. Execute Turing machine
6. Output current information
Write q or Q to quit
Enter Option
3
What state do you wish to add?
2 0 0 0 <-
1. Create dense Turing machine
2. Create sparse Turing machine
3. Add state to Turing machine
4. Compact Turing machine
5. Execute Turing machine
6. Output current information
Write q or Q to quit
Enter Option
5
How many steps do you wish to execute?
5
1. Create dense Turing machine
2. Create sparse Turing machine
3. Add state to Turing machine
4. Compact Turing machine
5. Execute Turing machine
6. Output current information
Write q or Q to quit
Enter Option
6
The current state is 0.
The current position is -1.
The content of the tape is 000.
The Turing machine has states: <0 0 1 1 ->> <0 1 0 0 <-> <1 0 2 1 ->> <2 0 0 0 <->
1. Create dense Turing machine
2. Create sparse Turing machine
3. Add state to Turing machine

4. Compact Turing machine
5. Execute Turing machine
6. Output current information
Write q or Q to quit
Enter Option
5
How many steps do you wish to execute?
-1
In step 6, the position is -1, but that is outside the tape.
1. Create dense Turing machine
2. Create sparse Turing machine
3. Add state to Turing machine
4. Compact Turing machine
5. Execute Turing machine
6. Output current information
Write q or Q to quit
Enter Option
6
The current state is 0.
The current position is -1.
The content of the tape is 000.
The Turing machine has states: <0 0 1 1 ->> <0 1 0 0 <-> <1 0 2 1 ->> <2 0 0 0 <->
1. Create dense Turing machine
2. Create sparse Turing machine
3. Add state to Turing machine
4. Compact Turing machine
5. Execute Turing machine
6. Output current information
Write q or Q to quit
Enter Option
q