```
Last login: Fri Jul 25 14:53:04 on ttys001
UFs-MacBook-Pro:~ tianwenlan$ cd Documents/Courses/CS/"COP3503 Programming fundamentals 2"/Homework/Hw03/COP
3503su14_HW03_G6
UFs-MacBook-Pro:COP3503su14_HW03_G6 tianwenlan$ make -f makefile
c++    -c -o COP3503su14_HW02_G6.o COP3503su14_HW02_G6.cpp
g++ COP3503su14_HW02_G6.cpp -o hanoi
UFs-MacBook-Pro:COP3503su14_HW03_G6 tianwenlan$ ./hanoi
--------------------------------------------------------------------------------
        This a program to solve the Towers of Hanoi problem.
        You can enter different numbers of disks to play with.
================================================================================
        0-exit
        1-Show the time to solve the tower of Hanoi problem with differnt number of disks
        2-Draw the graph time vs. number of disks
        3-Display the contents of all three towers every time a disk is moved
          (commands [./hanoi -s] will also display the contents of every step)
        4-Unshown the contents of every step
        5-Show menu
================================================================================
> 1
please enter the enter of disks you want to play:
(enter[0] to finish input)
6
[6]disks took 3.9e-05 seconds
please enter the enter of disks you want to play:
(enter[0] to finish input)
8
[8]disks took 6.2e-05 seconds
please enter the enter of disks you want to play:
(enter[0] to finish input)
12
[12]disks took 0.000656 seconds
please enter the enter of disks you want to play:
(enter[0] to finish input)
10
[10]disks took 0.000223 seconds
please enter the enter of disks you want to play:
(enter[0] to finish input)
14
[14]disks took 0.002709 seconds
please enter the enter of disks you want to play:
(enter[0] to finish input)
16
[16]disks took 0.008944 seconds
please enter the enter of disks you want to play:
(enter[0] to finish input)
0
> 2
y(time)
^
|
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|                                                   *
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|                                     *
|                                 *
|                            *
|
------------------------------------------------------------------> x(number of disks)
> 3
please enter the enter of disks you want to play:
enter [0] to end input
5
Tower 0: 5 4 3 2 1
Tower 1:
Tower 2:
=====================
Tower 0: 5 4 3 2
Tower 1:
Tower 2: 1
=====================
Tower 0: 5 4 3
Tower 1: 2
Tower 2: 1
=====================
Tower 0: 5 4 3
Tower 1: 2 1
Tower 2:
=====================
Tower 0: 5 4
Tower 1: 2 1
Tower 2: 3
=====================
Tower 0: 5 4 1
Tower 1: 2
Tower 2: 3
=====================
Tower 0: 5 4 1
Tower 1:
Tower 2: 3 2
=====================
Tower 0: 5 4
Tower 1:
Tower 2: 3 2 1
=====================
Tower 0: 5
Tower 1: 4
Tower 2: 3 2 1
=====================
Tower 0: 5
Tower 1: 4 1
Tower 2: 3 2
=====================
Tower 0: 5 2
Tower 1: 4 1
Tower 2: 3
=====================
Tower 0: 5 2 1
Tower 1: 4
Tower 2: 3
=====================
Tower 0: 5 2 1
Tower 1: 4 3
```

```
Tower 2:
======================
Tower 0: 5 2
Tower 1: 4 3
Tower 2: 1
======================
Tower 0: 5
Tower 1: 4 3 2
Tower 2: 1
======================
Tower 0: 5
Tower 1: 4 3 2 1
Tower 2:
======================
Tower 0:
Tower 1: 4 3 2 1
Tower 2: 5
======================
Tower 0: 1
Tower 1: 4 3 2
Tower 2: 5
======================
Tower 0: 1
Tower 1: 4 3
Tower 2: 5 2
======================
Tower 0:
Tower 1: 4 3
Tower 2: 5 2 1
======================
Tower 0: 3
Tower 1: 4
Tower 2: 5 2 1
======================
Tower 0: 3
Tower 1: 4 1
Tower 2: 5 2
======================
Tower 0: 3 2
Tower 1: 4 1
Tower 2: 5
======================
Tower 0: 3 2 1
Tower 1: 4
Tower 2: 5
======================
Tower 0: 3 2 1
Tower 1:
Tower 2: 5 4
======================
Tower 0: 3 2
Tower 1:
Tower 2: 5 4 1
======================
Tower 0: 3
Tower 1: 2
Tower 2: 5 4 1
======================
Tower 0: 3
Tower 1: 2 1
Tower 2: 5 4
======================
Tower 0:
Tower 1: 2 1
Tower 2: 5 4 3
======================
Tower 0: 1
Tower 1: 2
Tower 2: 5 4 3
======================
Tower 0: 1
```

```
Tower 1:
Tower 2: 5 4 3 2
=====================
Tower 0:
Tower 1:
Tower 2: 5 4 3 2 1
=====================
please enter the enter of disks you want to play:
enter [0] to end input
6
Tower 0: 6 5 4 3 2 1
Tower 1:
Tower 2:
=====================
Tower 0: 6 5 4 3 2
Tower 1: 1
Tower 2:
=====================
Tower 0: 6 5 4 3
Tower 1: 1
Tower 2: 2
=====================
Tower 0: 6 5 4 3
Tower 1:
Tower 2: 2 1
=====================
Tower 0: 6 5 4
Tower 1: 3
Tower 2: 2 1
=====================
Tower 0: 6 5 4 1
Tower 1: 3
Tower 2: 2
=====================
Tower 0: 6 5 4 1
Tower 1: 3 2
Tower 2:
=====================
Tower 0: 6 5 4
Tower 1: 3 2 1
Tower 2:
=====================
Tower 0: 6 5
Tower 1: 3 2 1
Tower 2: 4
=====================
Tower 0: 6 5
Tower 1: 3 2
Tower 2: 4 1
=====================
Tower 0: 6 5 2
Tower 1: 3
Tower 2: 4 1
=====================
Tower 0: 6 5 2 1
Tower 1: 3
Tower 2: 4
=====================
Tower 0: 6 5 2 1
Tower 1:
Tower 2: 4 3
=====================
Tower 0: 6 5 2
Tower 1: 1
Tower 2: 4 3
=====================
Tower 0: 6 5
Tower 1: 1
Tower 2: 4 3 2
=====================
Tower 0: 6 5
```

```
Tower 1:
Tower 2: 4 3 2 1
=====================
Tower 0: 6
Tower 1: 5
Tower 2: 4 3 2 1
=====================
Tower 0: 6 1
Tower 1: 5
Tower 2: 4 3 2
=====================
Tower 0: 6 1
Tower 1: 5 2
Tower 2: 4 3
=====================
Tower 0: 6
Tower 1: 5 2 1
Tower 2: 4 3
=====================
Tower 0: 6 3
Tower 1: 5 2 1
Tower 2: 4
=====================
Tower 0: 6 3
Tower 1: 5 2
Tower 2: 4 1
=====================
Tower 0: 6 3 2
Tower 1: 5
Tower 2: 4 1
=====================
Tower 0: 6 3 2 1
Tower 1: 5
Tower 2: 4
=====================
Tower 0: 6 3 2 1
Tower 1: 5 4
Tower 2:
=====================
Tower 0: 6 3 2
Tower 1: 5 4 1
Tower 2:
=====================
Tower 0: 6 3
Tower 1: 5 4 1
Tower 2: 2
=====================
Tower 0: 6 3
Tower 1: 5 4
Tower 2: 2 1
=====================
Tower 0: 6
Tower 1: 5 4 3
Tower 2: 2 1
=====================
Tower 0: 6 1
Tower 1: 5 4 3
Tower 2: 2
=====================
Tower 0: 6 1
Tower 1: 5 4 3 2
Tower 2:
=====================
Tower 0: 6
Tower 1: 5 4 3 2 1
Tower 2:
=====================
Tower 0:
Tower 1: 5 4 3 2 1
Tower 2: 6
=====================
```

```
Tower 0:
Tower 1: 5 4 3 2
Tower 2: 6 1
=====================
Tower 0: 2
Tower 1: 5 4 3
Tower 2: 6 1
=====================
Tower 0: 2 1
Tower 1: 5 4 3
Tower 2: 6
=====================
Tower 0: 2 1
Tower 1: 5 4
Tower 2: 6 3
=====================
Tower 0: 2
Tower 1: 5 4 1
Tower 2: 6 3
=====================
Tower 0:
Tower 1: 5 4 1
Tower 2: 6 3 2
=====================
Tower 0:
Tower 1: 5 4
Tower 2: 6 3 2 1
=====================
Tower 0: 4
Tower 1: 5
Tower 2: 6 3 2 1
=====================
Tower 0: 4 1
Tower 1: 5
Tower 2: 6 3 2
=====================
Tower 0: 4 1
Tower 1: 5 2
Tower 2: 6 3
=====================
Tower 0: 4
Tower 1: 5 2 1
Tower 2: 6 3
=====================
Tower 0: 4 3
Tower 1: 5 2 1
Tower 2: 6
=====================
Tower 0: 4 3
Tower 1: 5 2
Tower 2: 6 1
=====================
Tower 0: 4 3 2
Tower 1: 5
Tower 2: 6 1
=====================
Tower 0: 4 3 2 1
Tower 1: 5
Tower 2: 6
=====================
Tower 0: 4 3 2 1
Tower 1:
Tower 2: 6 5
=====================
Tower 0: 4 3 2
Tower 1: 1
Tower 2: 6 5
=====================
Tower 0: 4 3
Tower 1: 1
Tower 2: 6 5 2
```

```
======================
Tower 0: 4 3
Tower 1:
Tower 2: 6 5 2 1
======================
Tower 0: 4
Tower 1: 3
Tower 2: 6 5 2 1
======================
Tower 0: 4 1
Tower 1: 3
Tower 2: 6 5 2
======================
Tower 0: 4 1
Tower 1: 3 2
Tower 2: 6 5
======================
Tower 0: 4
Tower 1: 3 2 1
Tower 2: 6 5
======================
Tower 0:
Tower 1: 3 2 1
Tower 2: 6 5 4
======================
Tower 0:
Tower 1: 3 2
Tower 2: 6 5 4 1
======================
Tower 0: 2
Tower 1: 3
Tower 2: 6 5 4 1
======================
Tower 0: 2 1
Tower 1: 3
Tower 2: 6 5 4
======================
Tower 0: 2 1
Tower 1:
Tower 2: 6 5 4 3
======================
Tower 0: 2
Tower 1: 1
Tower 2: 6 5 4 3
======================
Tower 0:
Tower 1: 1
Tower 2: 6 5 4 3 2
======================
Tower 0:
Tower 1:
Tower 2: 6 5 4 3 2 1
======================
please enter the enter of disks you want to play:
enter [0] to end input
0
> 0
UFs-MacBook-Pro:COP3503su14_HW03_G6 tianwenlan$ ./hanoi -s
-------------------------------------------------------------------------------------
        This a program to solve the Towers of Hanoi problem.
        You can enter different numbers of disks to play with.
=====================================================================================
        0-exit
        1-Show the time to solve the tower of Hanoi problem with differnt number of disks
        2-Draw the graph time vs. number of disks
        3-Display the contents of all three towers every time a disk is moved
          (commands [./hanoi -s] will also display the contents of every step)
        4-Unshown the contents of every step
        5-Show menu
=====================================================================================
Content of every step will be shown!
```

```
> 1
please enter the enter of disks you want to play:
(enter[0] to finish input)
5
Tower 0: 5 4 3 2
Tower 1:
Tower 2: 1
======================
Tower 0: 5 4 3
Tower 1: 2
Tower 2: 1
======================
Tower 0: 5 4 3
Tower 1: 2 1
Tower 2:
======================
Tower 0: 5 4
Tower 1: 2 1
Tower 2: 3
======================
Tower 0: 5 4 1
Tower 1: 2
Tower 2: 3
======================
Tower 0: 5 4 1
Tower 1:
Tower 2: 3 2
======================
Tower 0: 5 4
Tower 1:
Tower 2: 3 2 1
======================
Tower 0: 5
Tower 1: 4
Tower 2: 3 2 1
======================
Tower 0: 5
Tower 1: 4 1
Tower 2: 3 2
======================
Tower 0: 5 2
Tower 1: 4 1
Tower 2: 3
======================
Tower 0: 5 2 1
Tower 1: 4
Tower 2: 3
======================
Tower 0: 5 2 1
Tower 1: 4 3
Tower 2:
======================
Tower 0: 5 2
Tower 1: 4 3
Tower 2: 1
======================
Tower 0: 5
Tower 1: 4 3 2
Tower 2: 1
======================
Tower 0: 5
Tower 1: 4 3 2 1
Tower 2:
======================
Tower 0:
Tower 1: 4 3 2 1
Tower 2: 5
======================
Tower 0: 1
Tower 1: 4 3 2
Tower 2: 5
```

```
=======================
Tower 0: 1
Tower 1: 4 3
Tower 2: 5 2
=======================
Tower 0:
Tower 1: 4 3
Tower 2: 5 2 1
=======================
Tower 0: 3
Tower 1: 4
Tower 2: 5 2 1
=======================
Tower 0: 3
Tower 1: 4 1
Tower 2: 5 2
=======================
Tower 0: 3 2
Tower 1: 4 1
Tower 2: 5
=======================
Tower 0: 3 2 1
Tower 1: 4
Tower 2: 5
=======================
Tower 0: 3 2 1
Tower 1:
Tower 2: 5 4
=======================
Tower 0: 3 2
Tower 1:
Tower 2: 5 4 1
=======================
Tower 0: 3
Tower 1: 2
Tower 2: 5 4 1
=======================
Tower 0: 3
Tower 1: 2 1
Tower 2: 5 4
=======================
Tower 0:
Tower 1: 2 1
Tower 2: 5 4 3
=======================
Tower 0: 1
Tower 1: 2
Tower 2: 5 4 3
=======================
Tower 0: 1
Tower 1:
Tower 2: 5 4 3 2
=======================
Tower 0:
Tower 1:
Tower 2: 5 4 3 2 1
=======================
[5]disks took 0.000948 seconds
please enter the enter of disks you want to play:
(enter[0] to finish input)
0
> 4
Content of every step will NOT be shown!
> 1
please enter the enter of disks you want to play:
(enter[0] to finish input)
4
[4]disks took 1e-05 seconds
please enter the enter of disks you want to play:
(enter[0] to finish input)
0
```