We have all four command-line options implemented:

./constructor -random-board

Gives a random board each time

./constructor -random-board -seed 4

Gives a random board with fixed seed 4 where 4 can be changed to other numbers (command order does not matter)

./constructor -load savefile.txt

Load a saved game in savefile.txt and start at stage During the Turn

./constructor -board layout.txt

Gives a board specified in the file layout.txt

./constructor

Using default board specified in the file layout.txt

./constructor -seed XXX

Also using default board specified in the file layout.txt

./constructor -random-board -load XXX or ./constructor -random-board -board XXX

Will ignore the -random-board (command order does not matter)

Any other combinations of command-line options are invalid and will receive error message.

Such as ./constructor -load XXX -board XXX

will output “ERROR: already specified -load, can't also specify -board” and end the program.

Example of games:

Test Beginning of Game (EOF in this stage will not be saved)

Check all 8 buildings are successfully built in this stage

```
./constructor -random-board -seed 1
Builder Blue where do you want to build a basement?
>0
Builder Red where do you want to build a basement?
>2
Builder Orange where do you want to build a basement?
>3
You cannot build here.
Builder Orange where do you want to build a basement?
>4
Builder Yellow where do you want to build a basement?
>6
Builder Yellow where do you want to build a basement?
>6
You cannot build here.
Builder Yellow where do you want to build a basement?
>33
```

Builder Orange where do you want to build a basement?

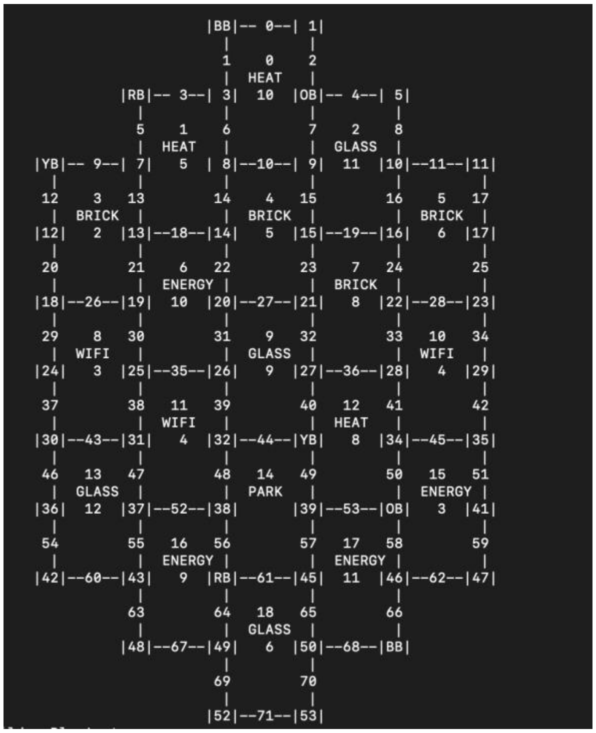
>40

Builder Red where do you want to build a basement?

>44

Builder Blue where do you want to build a basement?

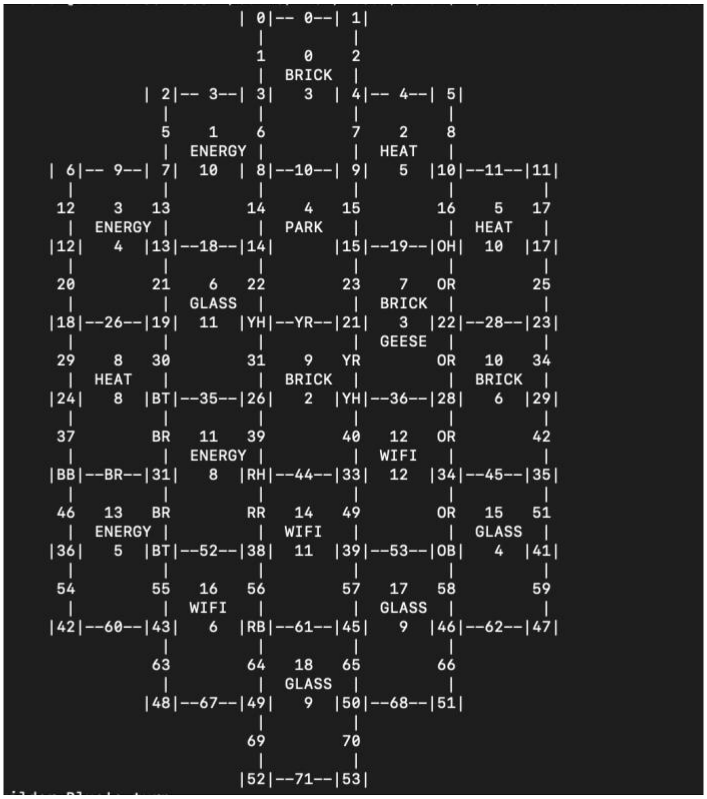
>51



```
                    |BB|-- 0--| 1|
                      |         |
                      1    0    2
                      |  HEAT   |
          |RB|-- 3--| 3|  10  |OB|-- 4--| 5|
            |         |         |         |
            5    1    6         7    2    8
            |  HEAT   |         |  GLASS  |
|YB|-- 9--| 7|   5  | 8|--10--| 9|  11  |10|--11--|11|
  |         |         |         |         |         |
 12    3   13        14    4   15        16    5   17
  |  BRICK  |         |  BRICK  |         |  BRICK  |
|12|   2  |13|--18--|14|   5  |15|--19--|16|   6  |17|
  |         |         |         |         |         |
 20        21    6   22        23    7   24        25
  |         |  ENERGY |         |  BRICK  |         |
|18|--26--|19|  10  |20|--27--|21|   8  |22|--28--|23|
  |         |         |         |         |         |
 29    8   30        31    9   32        33   10   34
  |  WIFI   |         |  GLASS  |         |  WIFI   |
|24|   3  |25|--35--|26|   9  |27|--36--|28|   4  |29|
  |         |         |         |         |         |
 37        38   11   39        40   12   41        42
  |         |  WIFI   |         |  HEAT   |         |
|30|--43--|31|   4  |32|--44--|YB|   8  |34|--45--|35|
  |         |         |         |         |         |
 46   13   47        48   14   49        50   15   51
  |  GLASS  |         |  PARK   |         |  ENERGY |
|36|  12  |37|--52--|38|      |39|--53--|OB|   3  |41|
  |         |         |         |         |         |
 54        55   16   56        57   17   58        59
  |         |  ENERGY |         |  ENERGY |         |
|42|--60--|43|   9  |RB|--61--|45|  11  |46|--62--|47|
            |         |         |         |
           63        64   18   65        66
            |         |  GLASS  |         |
          |48|--67--|49|   6  |50|--68--|BB|
                      |         |
                     69        70
                      |         |
                    |52|--71--|53|
```

Test Beginning of Turn (EOF in this stage will be saved to backup.sv)

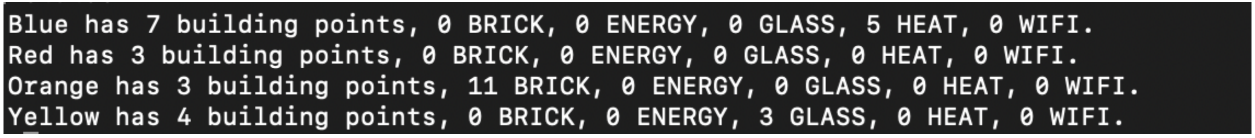
```
./constructor -load savefile.txt
```



```
                    | 0|-- 0--| 1|
                      |         |
                      1    0    2
                      |  BRICK  |
          | 2|-- 3--| 3|   3  | 4|-- 4--| 5|
            |         |         |         |
            5    1    6         7    2    8
            |  ENERGY |         |  HEAT   |
| 6|-- 9--| 7|  10  | 8|--10--| 9|   5  |10|--11--|11|
  |         |         |         |         |         |
 12    3   13        14    4   15        16    5   17
  |  ENERGY |         |  PARK   |         |  HEAT   |
|12|   4  |13|--18--|14|      |15|--19--|OH|  10  |17|
  |         |         |         |         |         |
 20        21    6   22        23    7   OR        25
  |         |  GLASS  |         |  BRICK  |         |
|18|--26--|19|  11  |YH|--YR--|21|   3  |22|--28--|23|
  |         |         |         |  GEESE  |         |
 29    8   30        31    9   YR        OR   10   34
  |  HEAT   |         |  BRICK  |         |  BRICK  |
|24|   8  |BT|--35--|26|   2  |YH|--36--|28|   6  |29|
  |         |         |         |         |         |
 37        BR   11   39        40   12   OR        42
  |         |  ENERGY |         |  WIFI   |         |
|BB|--BR--|31|   8  |RH|--44--|33|  12  |34|--45--|35|
  |         |         |         |         |         |
 46   13   BR        RR   14   49        OR   15   51
  |  ENERGY |         |  WIFI   |         |  GLASS  |
|36|   5  |BT|--52--|38|  11  |39|--53--|OB|   4  |41|
  |         |         |         |         |         |
 54        55   16   56        57   17   58        59
  |         |  WIFI   |         |  GLASS  |         |
|42|--60--|43|   6  |RB|--61--|45|   9  |46|--62--|47|
            |         |         |         |
           63        64   18   65        66
            |         |  GLASS  |         |
          |48|--67--|49|   9  |50|--68--|51|
                      |         |
                     69        70
                      |         |
                    |52|--71--|53|
```

Builder Blue's turn.

>status (print out status of each player)



```
Blue has 7 building points, 0 BRICK, 0 ENERGY, 0 GLASS, 5 HEAT, 0 WIFI.
Red has 3 building points, 0 BRICK, 0 ENERGY, 0 GLASS, 0 HEAT, 0 WIFI.
Orange has 3 building points, 11 BRICK, 0 ENERGY, 0 GLASS, 0 HEAT, 0 WIFI.
Yellow has 4 building points, 0 BRICK, 0 ENERGY, 3 GLASS, 0 HEAT, 0 WIFI.
```

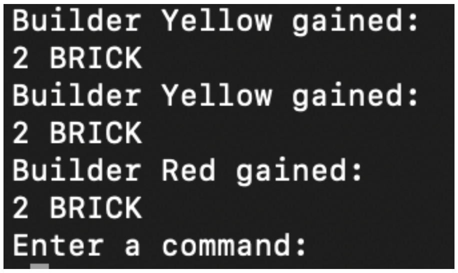
>fair (switch to fair dice)

>load (switch to load dice)

>roll (roll the dice)

Input a roll between 2 and 12:

>2

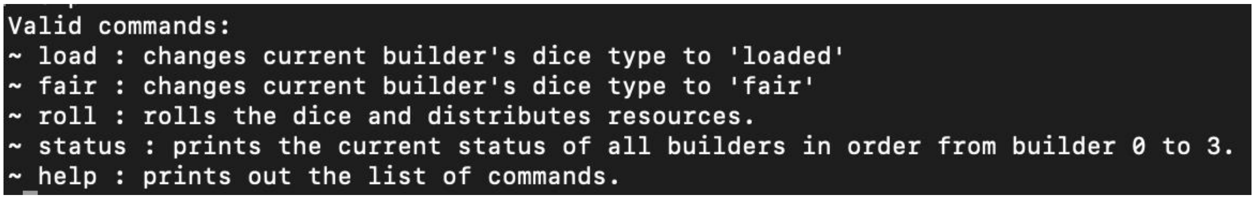


```
Builder Yellow gained:
2 BRICK
Builder Yellow gained:
2 BRICK
Builder Red gained:
2 BRICK
Enter a command:
```

./constructor -load savefile.txt

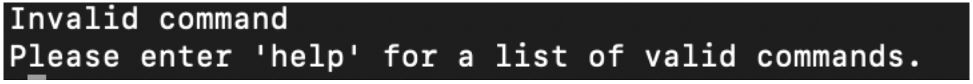
Builder Blue's turn.

>help (print valid input)



```
Valid commands:
~ load : changes current builder's dice type to 'loaded'
~ fair : changes current builder's dice type to 'fair'
~ roll : rolls the dice and distributes resources.
~ status : prints the current status of all builders in order from builder 0 to 3.
~ help : prints out the list of commands.
```

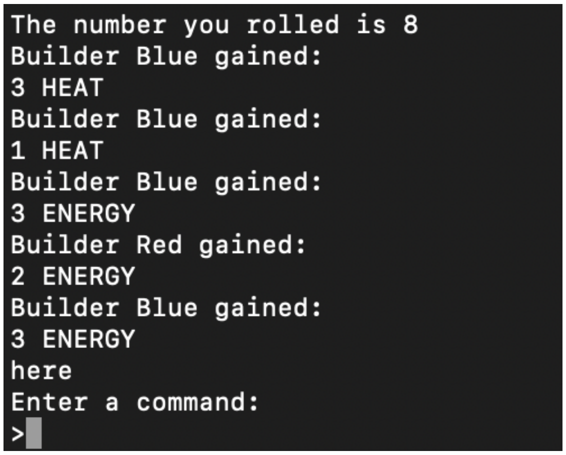
>residences (this is an example of invalid input in Beginning of Turn stage)



```
Invalid command
Please enter 'help' for a list of valid commands.
```

>fair

>roll



```
The number you rolled is 8
Builder Blue gained:
3 HEAT
Builder Blue gained:
1 HEAT
Builder Blue gained:
3 ENERGY
Builder Red gained:
2 ENERGY
Builder Blue gained:
3 ENERGY
here
Enter a command:
>
```

// test for geese

// steal

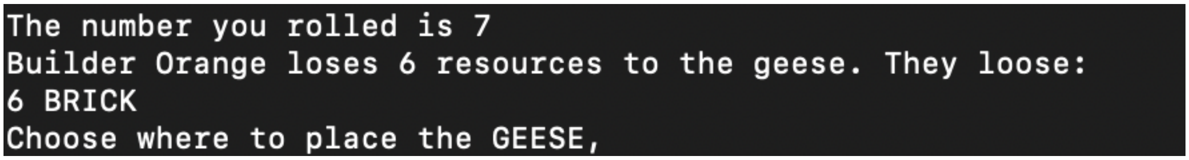
./constructor -load savefile.txt

Builder Blue's turn.

>roll

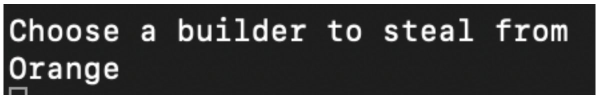
Input a roll between 2 and 12:

>7



```
The number you rolled is 7
Builder Orange loses 6 resources to the geese. They loose:
6 BRICK
Choose where to place the GEESE,
```

2

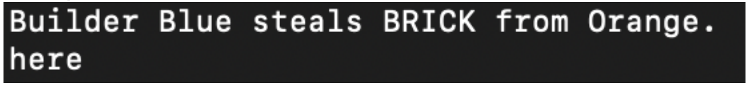


```
Choose a builder to steal from
Orange
```

Blue

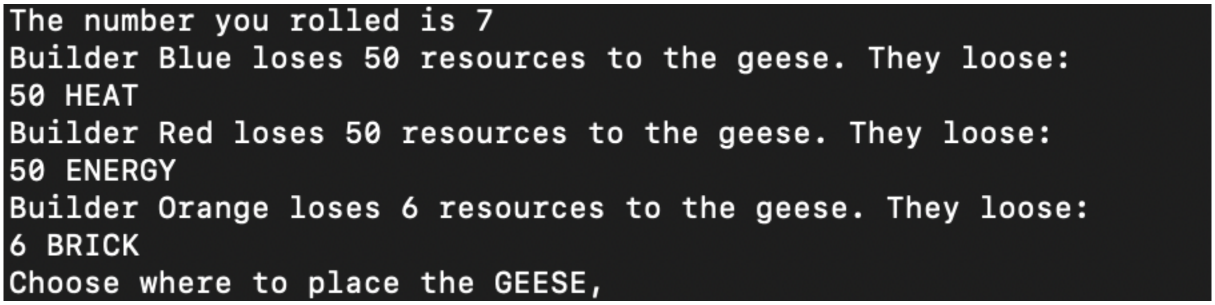
Invalid player

Orange



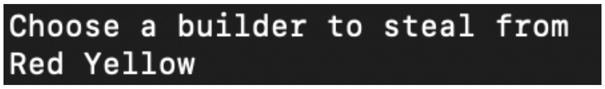
```
Builder Blue steals BRICK from Orange.
here
```

```
// checking lose half and geese on the tile and no one can steal
./constructor -load turn.txt
Builder Red's turn.
>roll
Input a roll between 2 and 12:
>7
```



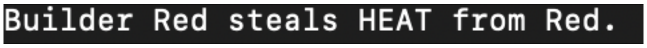
```
The number you rolled is 7
Builder Blue loses 50 resources to the geese. They loose:
50 HEAT
Builder Red loses 50 resources to the geese. They loose:
50 ENERGY
Builder Orange loses 6 resources to the geese. They loose:
6 BRICK
Choose where to place the GEESE,
```

```
>9
```



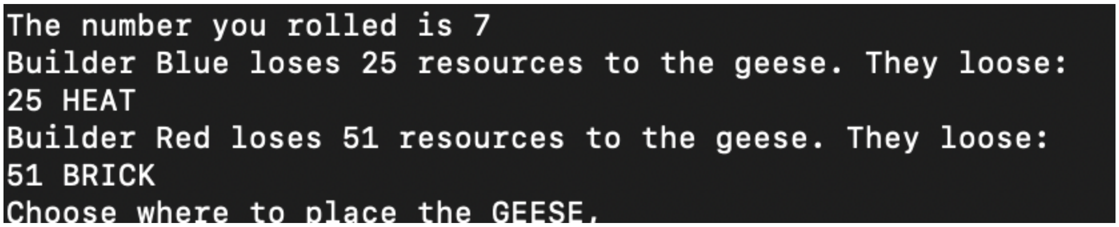
```
Choose a builder to steal from
Red Yellow
```

```
>Red
```



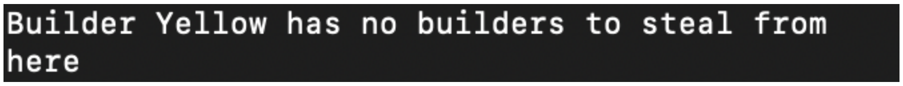
```
Builder Red steals HEAT from Red.
```

```
>next
Builder Orange's turn.
>roll
Input a roll between 2 and 12:
>4
>next
Builder Yellow's turn.
>roll
>7
```



```
The number you rolled is 7
Builder Blue loses 25 resources to the geese. They loose:
25 HEAT
Builder Red loses 51 resources to the geese. They loose:
51 BRICK
Choose where to place the GEESE,
```

```
>3
```



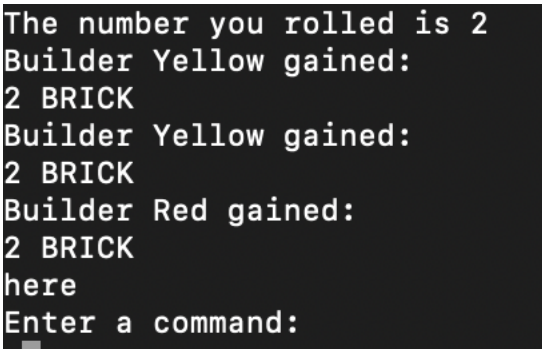
```
Builder Yellow has no builders to steal from
here
```

Test During the Turn (EOF in this stage will be saved to backup.sv)

```
(test all commands other than build-road, build-res and improve)
./constructor -load savefile.txt
>roll  (this is in Beginning of Turn stage)
```

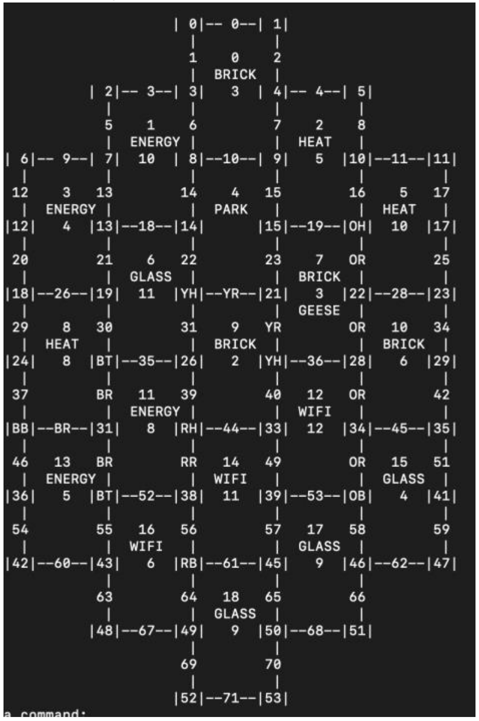
Input a roll between 2 and 12:

>2



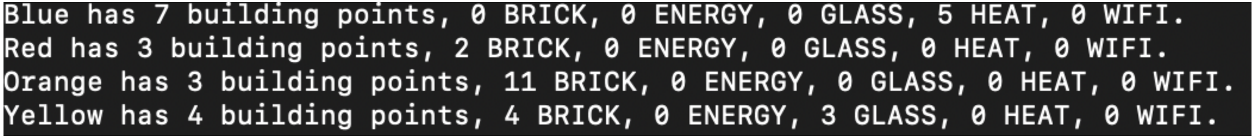
```
The number you rolled is 2
Builder Yellow gained:
2 BRICK
Builder Yellow gained:
2 BRICK
Builder Red gained:
2 BRICK
here
Enter a command:
```

>board (print out the board)



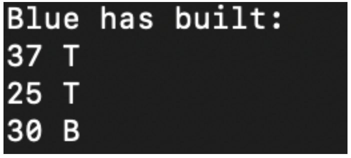
```
                    | 0|-- 0--| 1|
                      |         |
                      1    0    2
                      |  BRICK  |
          | 2|-- 3--| 3|   3  | 4|-- 4--| 5|
            |         |         |         |
            5    1    6         7    2    8
            |  ENERGY |         |  HEAT   |
| 6|-- 9--| 7|  10  | 8|--10--| 9|   5  |10|--11--|11|
  |         |         |         |         |         |
 12    3   13        14    4   15        16    5   17
  |  ENERGY |         |  PARK   |         |  HEAT   |
|12|   4  |13|--18--|14|      |15|--19--|OH|  10  |17|
  |         |         |         |         |         |
 20        21    6   22        23    7   OR        25
  |         |  GLASS  |         |  BRICK  |         |
|18|--26--|19|  11  |YH|--YR--|21|   3  |22|--28--|23|
  |         |         |         |  GEESE  |         |
 29    8   30        31    9   YR        OR   10   34
  |  HEAT   |         |  BRICK  |         |  BRICK  |
|24|   8  |BT|--35--|26|   2  |YH|--36--|28|   6  |29|
  |         |         |         |         |         |
 37        BR   11   39        40   12   OR        42
  |         |  ENERGY |         |  WIFI   |         |
|BB|--BR--|31|   8  |RH|--44--|33|  12  |34|--45--|35|
  |         |         |         |         |         |
 46   13   BR        RR   14   49        OR   15   51
  |  ENERGY |         |  WIFI   |         |  GLASS  |
|36|   5  |BT|--52--|38|  11  |39|--53--|OB|   4  |41|
  |         |         |         |         |         |
 54        55   16   56        57   17   58        59
  |         |  WIFI   |         |  GLASS  |         |
|42|--60--|43|   6  |RB|--61--|45|   9  |46|--62--|47|
            |         |         |         |
           63        64   18   65        66
            |         |  GLASS  |         |
          |48|--67--|49|   9  |50|--68--|51|
                      |         |
                     69        70
                      |         |
                    |52|--71--|53|
a command:
```

>status (print out players' status)



```
Blue has 7 building points, 0 BRICK, 0 ENERGY, 0 GLASS, 5 HEAT, 0 WIFI.
Red has 3 building points, 2 BRICK, 0 ENERGY, 0 GLASS, 0 HEAT, 0 WIFI.
Orange has 3 building points, 11 BRICK, 0 ENERGY, 0 GLASS, 0 HEAT, 0 WIFI.
Yellow has 4 building points, 4 BRICK, 0 ENERGY, 3 GLASS, 0 HEAT, 0 WIFI.
```

>residences (print out this player's residences)

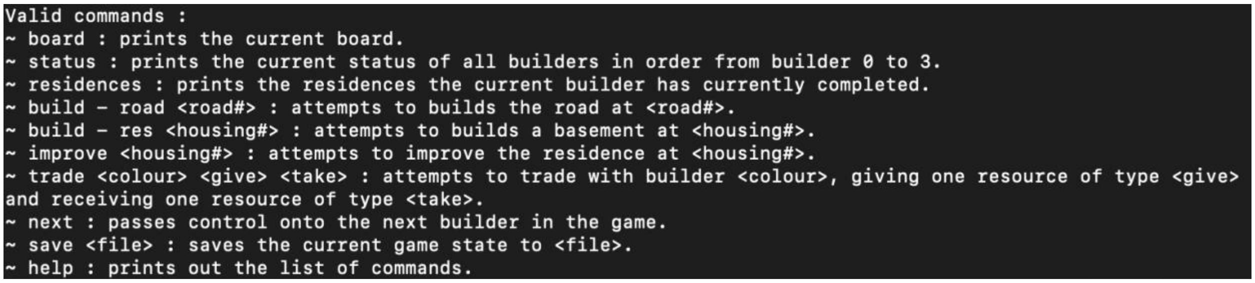


```
Blue has built:
37 T
25 T
30 B
```

>save saved.txt (save the game to saved.txt)

Enter a command:

>help (print valid input)

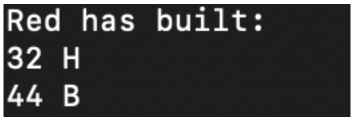


```
Valid commands :
~ board : prints the current board.
~ status : prints the current status of all builders in order from builder 0 to 3.
~ residences : prints the residences the current builder has currently completed.
~ build - road <road#> : attempts to builds the road at <road#>.
~ build - res <housing#> : attempts to builds a basement at <housing#>.
~ improve <housing#> : attempts to improve the residence at <housing#>.
~ trade <colour> <give> <take> : attempts to trade with builder <colour>, giving one resource of type <give>
and receiving one resource of type <take>.
~ next : passes control onto the next builder in the game.
~ save <file> : saves the current game state to <file>.
~ help : prints out the list of commands.
```

```
>next  (move to next player)
```

Builder Red's turn.

```
>roll
>4
>residences
```



```
Red has built:
32 H
44 B
```

```
>next
```

Builder Orange's turn.

```
>roll
>4
>next
```

Builder Yellow's turn.

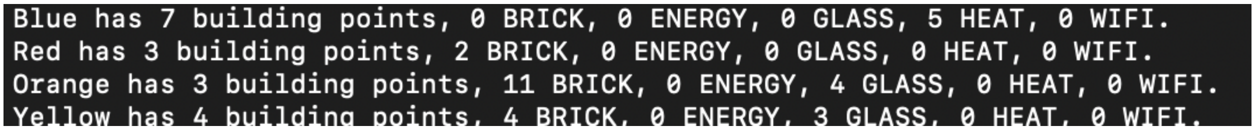
```
>roll
>4
>next
```

Builder Blue's turn.

```
>roll
>4
>next
```

Builder Red's turn.

```
>status
```



```
Blue has 7 building points, 0 BRICK, 0 ENERGY, 0 GLASS, 5 HEAT, 0 WIFI.
Red has 3 building points, 2 BRICK, 0 ENERGY, 0 GLASS, 0 HEAT, 0 WIFI.
Orange has 3 building points, 11 BRICK, 0 ENERGY, 4 GLASS, 0 HEAT, 0 WIFI.
Yellow has 4 building points, 4 BRICK, 0 ENERGY, 3 GLASS, 0 HEAT, 0 WIFI.
```

(test command build-res and improve and trade)

```
./constructor -load turn.txt
```

Builder Red's turn.

```
>roll
>4
```

Enter a command:

```
>build-res
>improve
>trade
```

Test End of Game

```
./constructor -load end.txt
>roll
>2
>build-road 55
>build-road 60
>build-res 42
>next
>yes
```

(a new random board is created)