## Shimokita



Designed and mad by Minoru Abe, circa 1985.
(cardboard box $5+1 / 4 " \times 6.25 " \times 7 / 8 "$ ", 10 wood pieces, blue keeper, and directions)
The directions show three positions, giving rise to three problems:


Copyright J. A. Storer

## Shimokita Solutions

Similar to the Moota-Kun puzzle by the same designer, a tricky solution is made more difficult because it can be cumbersome to keep track of pieces that are labeled by portions of a drawing.
The big piece at the bottom has a nook that makes it natural to perform a capture movement where it slides left or right with another piece in its nook. Here, we limit capture movement to one of the small pieces being carried, where when in the nook the small piece does not extend beyond the bounding rectangle of the big piece.
The following three pages show solutions for the three Shimokita problems where capture movement is allowed. Note, however, that by using move moves, without any capture movement Shimokita $1->3$ can be solved in 58 rectilinear moves, Shimokita $1->2$ in 55 rectilinear moves, and Shimokita $2->3$ in 65 rectilinear moves.

The figures here have piece labels added to match the solutions on the following pages. In all three solutions, the big piece labeled $X$, stays on the bottom and moves only two times.
For Shimokita $1->3$, here are positions 13 and 39 just after each move of $X$ :


For Shimokita $1->2$, here are positions 23 and 37 just after each move of $X$ :


For the $2->3$ problem, here are positions 20 and 46 just after each move of $X$ :


Copyright J. A. Storer

## Shimokita Solution, 1 -> 3 (page 1/2)

Here is a solution of 51 rectilinear moves ( 72 straight-line moves):

| 0: | 1. Nove 6: | 2. Move 5: | 3. Move 4: |
| :---: | :---: | :---: | :---: |
| $\begin{array}{llllllllllll}3 & 3 & 3 & 4 & 4 & 4 & 5 & 5 & 5\end{array}$ | $\begin{array}{llllllllllll}3 & 3 & 3 & 4 & 4 & 4 & 5 & 5 & 5 & \$\end{array}$ | $\begin{array}{llllllll}3 & 3 & 3 & 4 & 4 & 4 & \\ 3 & \$\end{array}$ | $\begin{array}{lll}3 & 3 & 3\end{array}$ |
| $\begin{array}{llllllllll}3 & 3 & 3 & 4 & 4 & 4 & 5 & 5 & 5\end{array}$ | $\begin{array}{llllllllll}3 & 3 & 3 & 4 & 4 & 4 & 5 & 5 & 5\end{array}$ | $\begin{array}{llllll}3 & 3 & 3 & 4 & 4 & 4\end{array}$ | 3 3 |
| $222 Q Q Q 555$ | $2229 Q 2555$ | $222 Q Q Q$ | $222 Q Q Q \quad 444$ |
| 222 Q Q Q 666 | $222 Q Q Q 666$ | $222 Q Q Q 555666$ | $222 Q Q Q 555666$ |
| 2229 Q Q 666 | $222 Q Q Q 66$ | $222 Q Q 9555666$ | $222 Q Q Q 555666$ |
| 111 B B B 666 | $\begin{array}{lll}111 B B B & 666\end{array}$ |  | $11188 B 555666$ |
| 111 BBBXXXAAA | 111 BBBXXXAAA | 1 BBBXXXAAA | 111 BEBXXXAAA |
|  | $\mathrm{X} \times \mathrm{X}$ B B B $\mathrm{X} \times \mathrm{XXAAA}$ | X $\mathrm{X} \times \mathrm{BBBBXXXAAA}$ | X X X B B B X X X A A |
|  |  |  | $\mathrm{x} \times \mathrm{x} \times \mathrm{XXXXXXAXA}$ |
| 4. Move Q: | 5. Move 3: | 6. Move 2: | 7. Move 1: |
| $\begin{array}{llll}3 & 3 & 3 & Q Q Q \$ \$ \$\end{array}$ | 333 Q 3 Q \$ \$ \$ | $\begin{array}{llllllll}2 & 2 & 2 & 3 & 3 & 3 & Q & Q\end{array}$ | $\begin{array}{llllllll}2 & 2 & 2 & 3 & 3 & 3 & Q\end{array}$ |
| $\begin{array}{llll}3 & 3 & 3 & 292444\end{array}$ | 333929444 | $\begin{array}{llllllll}2 & 2 & 2 & 3 & 3 & 3 & 9 & 9\end{array}$ | $\begin{array}{llllllll}2 & 2 & 2 & 3 & 3 & 3 & 9 & 9\end{array}$ |
| 22208044 | 22208044 | 2929444 |  |
| $\begin{array}{lll}2 & 22 & 555666\end{array}$ | $\begin{array}{lll}2 & 2 & 2\end{array}$ | 555666 | 1111555666 |
| 2225056 | $222 \begin{aligned} & 225666\end{aligned}$ | 555666 | 555666 |
| $\begin{array}{lllllllllll}1 & 1 & \text { B B B } & 5 & 5 & 6 & 6\end{array}$ | $\begin{array}{lllllllllllll}1 & 1 & 1 & \text { B } & \mathrm{B} & \mathrm{B} & 5 & 5 & 5 & 6 & 6 & 6\end{array}$ | $\begin{array}{lllllllllllll}11 & 1 & \text { B B } & 5 & 5 & 6 & 6\end{array}$ | B B B 5555666 |
| 1118 B B B X X X A A A | $1 \begin{array}{llllll}1 & 1 & \mathrm{~B} & \mathrm{~B} & \mathrm{BXXXXXA}\end{array}$ |  | B B B X X X A A |
|  | $\overline{\mathrm{X}} \mathrm{X} \mathrm{X}$ B B B X X X A A A |  |  |
|  | $\mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x}$ A A A | $\mathrm{X} \times \mathrm{x} \times \mathrm{X} \times \mathrm{X} \times \mathrm{XAA}$ A | X $\mathrm{X} \times \mathrm{x} \times \mathrm{X} \times \mathrm{X} \times \mathrm{XAA}$ |
| 8. Move B: | 9. Move 1: | 10. Move 5: | 11. Move 6: |
| $\begin{array}{lllllll}2 & 2 & 2 & 3 & 3 & 3\end{array}$ | $\begin{array}{llllllll}2 & 2 & 2 & 3 & 3 & 3 & Q\end{array}$ | $\begin{array}{llllllll}2 & 2 & 2 & 3 & 3 & 3 & Q & Q\end{array}$ | $\begin{array}{lllllll}2 & 2 & 2 & 3 & 3 & 3 & Q\end{array}$ |
| $\begin{array}{lllllll}2 & 2 & 2 & 3 & 3 & 3\end{array}$ |  | $\begin{array}{lllllll}2 & 2 & 2 & 3 & 3 & 3 & Q\end{array}$ | $\begin{array}{llllllll}2 & 2 & 2 & 3 & 3 & 3\end{array}$ |
|  | 22202944 | 2220044 | 22202944 |
| 111555666 | 5 5 55666 | 666 | $\begin{array}{llllll}5 & 5 & 5 & 6 & 6\end{array}$ |
| B B B $\quad 555666$ | B B B $\quad 555666$ | B B B 555 | В в B 555666 |
| B B B $\quad 555666$ | B B B $\quad 555666$ | В В B 555 析 666 | В В В 555666 |
| B BB $\mathrm{BXXXAA}^{\text {A }}$ |  | B B B $111 \times \mathrm{X} \times \mathrm{X}$ A A | B B B $1111 \times \mathrm{X} \times \mathrm{A}$ A A |
| $\mathrm{XXX} \quad \mathrm{x} \times \mathrm{x}$ A A A | $\mathrm{X} \times \mathrm{X} \times 1111 \times \mathrm{l}$ | $\mathrm{X} \times \mathrm{X} 11^{1} 1 \times \mathrm{X} \times \mathrm{X}$ A A A |  |
|  |  | $\mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x}$ AAA |  |
| 12. Move A: | 13. Move X : | 14. Move B: | 15. Move 5: |
| $\begin{array}{llllllll}2 & 2 & 2 & 3 & 3 & 3 & Q\end{array}$ | $\begin{array}{lllllll}2 & 2 & 2 & 3 & 3 & 3 & Q\end{array}$ | $\begin{array}{lllllll}2 & 2 & 2 & 3 & 3 & 3\end{array}$ | $\begin{array}{lllllll}2 & 2 & 2 & 3 & 3 & 3 & Q\end{array}$ |
| $\begin{array}{lllllllll}2 & 2 & 2 & 3 & 3 & 3 & 9 & Q & 9\end{array} 4444$ | $\begin{array}{lllllllll}2 & 2 & 2 & 3 & 3 & 3 & Q & Q & 9\end{array} 444$ | $\begin{array}{llllllll}2 & 2 & 2 & 3 & 3 & 3 & Q & Q\end{array}$ | $\begin{array}{lllllll}2 & 2 & 2 & 3 & 3 & 3 & Q\end{array}$ |
| $\begin{array}{llll}2 & 2 & 2 & 9\end{array}$ | 2220.2044 | 2220924 | $\begin{array}{lll}2 & 2 & 2\end{array}$ |
| 555666 A A A | 555666 A A A | 555666 A A A | 555 |
| B B B 555666 A A A | B B B 555666 A A A | 555666 A A A | 555 |
| B B B 555666 A A A | B B B 555666 A A A | 555666 A A A | 555666 A A A |
| B B B $1.111 \times \mathrm{X} \times \mathrm{X}$ | B B B $\quad 1118 \times \mathrm{x}$ | B B B $\quad 111 \times 8 \mathrm{X}$ | B B B $\quad 111 \mathrm{XXX}$ |
|  |  | B B B X X X 1 1 1 X X X |  |
| $\mathrm{X} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x} \mathrm{x}$ | $\mathrm{x} \times \mathrm{x} \times \mathrm{x} \times$ | B B X X X X X X X | B B B X X X X X X X |
| 16. Move 3: | 17. Move Q: | 18. Move 6: | 19. Move 1: |
| 222009 Q \$ | 2220.0 Q \$ \$ | $2220 Q 9666 \$ \$ \$$ | $2220 Q Q 666 \$ \$ \$$ |
| 222084 | $222 Q Q Q 44$ | $222 Q Q Q 666444$ | $222 Q Q Q 666444$ |
| $\begin{array}{llll}2 & 2 & 2 & 9 \\ 5 & 5 & 9 & 4\end{array}$ | $\begin{array}{lll}222 & 2\end{array}$ |  |  |
| $\begin{array}{lllllllllll}5 & 5 & 5 & 3 & 3 & 3 & 6 & 6 & 6 \\ \text { A A A }\end{array}$ | $\begin{array}{llllllllll}5 & 5 & 5 & 3 & 3 & 3 & 6 & 6 & 6 \\ \text { A A A }\end{array}$ | $\begin{array}{lllllll}5 & 5 & 5 & 3 & 3 & 3\end{array}$ | $\begin{array}{lllllll}5 & 5 & 5 & 3 & 3 & 3\end{array}$ |
| 55 55 | $\begin{array}{llllllllllll}5 & 5 & 5 & 3 & 3 & 3 & 6 & 6 & \text { A A A }\end{array}$ | $\begin{array}{lllllll}5 & 5 & 3 & 3 & 3\end{array}$ | $\begin{array}{llllll}5 & 5 & 5 & 3 & 3 & 3\end{array}$ |
| 555666 A A A | 555666 A ¢ S | 555 A A A | 5 5 5 5 1 1 1 1 A A A |
| B B B $\quad 1 \begin{array}{llll}1 & 1\end{array}$ | B B B $\mathrm{Br}^{1} 111 \times \mathrm{X}$ | B B B $\quad 1$1 1 $X$ $X$ $X$ |  |
|  | B B B X X X 111118 X ¢ X | B B B X X X $11111 \times \mathrm{X}$ | B B B X X X X X |
| B B B X X X X X X X X X | B B B X X X X X X X X | B B B X X X X X X X X X | B B B X X X X X X X X X |
| 20. Move A: | 21. Move 4: | 22. Move 6: | 23. Move Q: |
| 222 Q Q Q $666 \$ \$ \$$ | 222 Q Q Q $666 \$ \$ \$$ |  | 2220 Q Q \$ \$ |
| $2220 Q 9666444$ | $2220 Q 666$ | $222 Q Q Q 666$ | $222 \begin{aligned} & 22\end{aligned}$ |
|  | 22290.666 | $2229 Q 966$ | $\begin{array}{llll}2 & 2 & 2 & Q 8666\end{array}$ |
| $\begin{array}{lllllll}5 & 5 & 5 & 3 & 3 & 3\end{array}$ | $\begin{array}{lllllll}5 & 5 & 5 & 3 & 3 & 3\end{array}$ | 5 5 $5 \begin{aligned} & 3 \\ & 5\end{aligned}$ | 5 5 $5 \begin{aligned} & 3 \\ & 5\end{aligned}$ |
| $\begin{array}{llllllll}5 & 5 & 5 & 3 & 3 & 3 & \text { A A A }\end{array}$ |  | 5 5 55533383 A A A 4.44 |  |
| $\begin{array}{ccccccc}5 & 5 & 5 & 1 & 1 & 1 & \text { A A A }\end{array}$ |  |  |  |
| B B B 111 A A A X X X | B B B 111 A A A X X X |  | B B B 111 A A $\mathrm{A} \times \mathrm{XXX}$ |
| B B B X X X X X X | B B B X X X $\quad$ X X X | B B B X X X $\mathrm{BXXX}^{\text {B }}$ | B B B X X X |
| B B B X X X X X X X X | B B B X X X X X X X | B B B X X X X X X X X X | B B B X X X X X X X X X |
| 24. Move 3: | 25. Move 1: | 26. Move A: | 27. Move Q: |
| $2 \begin{array}{llllllll}2 & 2 & 3 & 3 & Q\end{array}$ | $2 \begin{array}{llllllll}2 & 2 & 3 & 3 & Q\end{array}$ | $2 \begin{array}{lllllll} & 2 & 2 & 3 & 3\end{array}$ | 22 2 3 3 3 $\$$ |
| $\begin{array}{llllllll}2 & 2 & 2 & 3 & 3 & \text { Q Q Q }\end{array}$ | $\begin{array}{llllllll}2 & 2 & 2 & 3 & 3 & 3 & Q\end{array}$ |  | $\begin{array}{llllll}2 & 2 & 2 & 3 & 3 & 666\end{array}$ |
| $\begin{array}{lll}2 & 2 & 2\end{array}$ | $\begin{array}{lllllllll}2 & 2 & 2 & 1 & 1 & 1\end{array}$ | $2 \begin{array}{llllllll} & 2 & 2 & 1 & 1 & 1\end{array} Q^{2} Q Q 6666$ |  |
| 555 | $\begin{array}{rccccccc}5 & 5 & 5 & 1 & 1 & 1 & 6 & 6\end{array}$ | $\begin{array}{lllllllll}5 & 5 & 5 & 1 & 1 & 1 & 6 & 6 & 6\end{array}$ |  |
| $\begin{array}{lll}5 & 5 & \text { A A A } 444\end{array}$ | 555 | 555 A A A 444 | 555 AAAQQQ 444 |
|  | 555 A A A 444 | $555 \mathrm{AAA} \quad 444$ | 555 AAA Q Q Q 444 |
|  | B B B A A A X X A |  |  |
|  | B B B X X $\mathrm{Brax}^{\text {B }}$ |  |  |
| B B B XXXXXXXXX | B B B X X X X X X | B B BXXXXXXXXX | B B B X X X X X X |

## Shimokita Solution, 1 -> 3 (page 2/2)

| 28. Move 6: <br> $2 \begin{array}{lllllllllll}2 & 2 & 3 & 3 & 3 & 6 & 6 & 6 & \$\end{array} \$$ | 29. Move 4: <br> $\begin{array}{llllllllllll}2 & 2 & 2 & 3 & 3 & 3 & 6 & 6 & 6 & \$\end{array} \$$ | 30. Move Q: | 31. Move A: <br> $\begin{array}{llllllllllll}2 & 2 & 2 & 3 & 3 & 3 & 6 & 6 & 6 & \$\end{array} \$ \$$ |
| :---: | :---: | :---: | :---: |
| $\begin{array}{lllllllllll}2 & 2 & 2 & 3 & 3 & 3 & 6 & 6 & 6\end{array}$ | $\begin{array}{lllllllllllll}2 & 2 & 2 & 3 & 3 & 3 & 6 & 6 & 6 & 4 & 4 & 4\end{array}$ | $\begin{array}{llllllllllllll}2 & 2 & 2 & 3 & 3 & 3 & 6 & 6 & 6 & 4 & 4 & 4\end{array}$ | $\begin{array}{llllllllllllll}2 & 2 & 2 & 3 & 3 & 3 & 6 & 6 & 6 & 4 & 4 & 4\end{array}$ |
| $\begin{array}{lllllllllll}2 & 2 & 2 & 1 & 1 & 1 & 6 & 6 & 6\end{array}$ | $\begin{array}{lllllllllllllll}2 & 2 & 2 & 1 & 1 & 1 & 6 & 6 & 6 & 4 & 4 & 4\end{array}$ | $\begin{array}{llllllllllllll}2 & 2 & 2 & 1 & 1 & 1 & 6 & 6 & 6 & 4 & 4\end{array}$ | $\begin{array}{lllllllllllllll}2 & 2 & 2 & 1 & 1 & 1 & 6 & 6 & 6 & 4 & 4 & 4\end{array}$ |
| $\begin{array}{lllllllll}5 & 5 & 5 & 1 & 1 & 1\end{array}$ | $\begin{array}{llllllll}5 & 5 & 5 & 1 & 1 & 1\end{array}$ | $\begin{array}{llllllllllllllll}5 & 5 & 5 & 1 & 1 & 1 & \text { Q Q Q }\end{array}$ | $\begin{array}{llllllllllllllll}5 & 5 & 5 & 1 & 1 & Q\end{array}$ |
| $555 \mathrm{AAAQQQ4} 4$ | 555 AAAQQQ | 555 AAA $5^{5} \mathrm{C}$ Q Q | 555 |
| $555 \mathrm{AAAQQQ} \mathrm{S}^{5} 44$ | 555 A A A Q Q Q | 555 AAA ${ }^{5} \mathrm{C}$ Q Q | 555 A A A Q Q Q |
| B B BAAA Q Q Q X X $\mathrm{X}^{\text {A }}$ | B B BAAA C Q Q ¢ XX | B B A A A XXX | B B B AAAXXX |
|  |  |  | B B B X X X A A X X X |
|  |  |  |  |
| 32. Move 1: | 33. Move 6: | 34. Move A: | 35. Move 1: |
| $\begin{array}{llllllllllll}2 & 2 & 2 & 3 & 3 & 3 & 6 & 6 & 6\end{array} \$ \$$ | $\begin{array}{llllllll}2 & 2 & 2 & 3 & 3 & 3\end{array}$ | $\begin{array}{lllllll}2 & 2 & 2 & 3 & 3 & 3 \\ \text { A A A }\end{array}$ | $\begin{array}{lllllllllll}2 & 2 & 2 & 3 & 3 & 3 & \text { A A A \$ \$ \$ }\end{array}$ |
| $\begin{array}{llllllllllllll}2 & 2 & 2 & 3 & 3 & 3 & 6 & 6 & 6 & 4 & 4 & 4\end{array}$ | $\begin{array}{llllll}2 & 2 & 2 & 3 & 3 & 3\end{array}$ | $\begin{array}{llllll}2 & 2 & 2 & 3 & 3 & 3 \\ \text { A A A }\end{array}$ | $\begin{array}{llllllll}2 & 2 & 3 & 3 & 3 & \text { A A A } 444\end{array}$ |
| $\begin{array}{lllll}2 & 2 & 6 & 6 & 6444\end{array}$ | 22266664 | 2666 A A A 44 |  |
| 555 | $\begin{array}{cccc}5 & 5 & 666\end{array}$ | 555666 | 55566660 |
| 555 | $\begin{array}{ccccc}5 & 5 & 666\end{array}$ | $\begin{array}{lccccc}5 & 5 & 6 & 6 & \text { Q Q Q }\end{array}$ | 555666020 |
| 5551118 A ¢ S ¢ Q Q | 55511118 A ¢ S ¢ Q Q | 5551111009 | 555 |
| B B B 111 A A A X X X | B B B 111 A A A X X X |  | B B B $\quad 111 \mathrm{XXX}$ |
| B B BXXXAAAXX | B B B X X X A A X X X |  | B B B X X X 1 1 1 X X X |
| B B B X X X X X X X X | B B B X X X X X X X X | B B B X X X X X X X X | B B B X X X X X X X X |
| 36. Move 6: | 37. Move 5: | 38. Move B: | 39. Move X: |
| 222333 AAA \$ \$ \$ | 222333 AAA \$ \$ \$ | 222333 A A A \$ \$ \$ | 222333 A A A \$ \$ \$ |
|  | $\begin{array}{llllllll}2 & 2 & 2 & 3 & 3 & 3 & \text { A A A }\end{array}$ | $\begin{array}{llllll}2 & 2 & 2 & 3 & 3 & 3 \\ \text { A A A }\end{array}$ |  |
| 2220 A A A 444 | $222 \begin{array}{lll}2 & 2\end{array}$ | 222 A A A 444 | $222 \begin{array}{lll}2 & \text { A A A } 4\end{array}$ |
| $5556669 Q$ | 5666 Q ¢ Q | $\begin{array}{lllllll}5 & 5 & 6 & 6 & Q Q Q\end{array}$ | $\begin{array}{lllllll}5 & 5 & 5 & 6 & Q\end{array}$ |
| 555066690 | 55666929 | B B B $5556669 \%$ | B B B 5556666929 |
| 555666909 | 55666929 | 55566692 | B B B 5556669 Q ¢ C |
| B B B $\quad 111 \mathrm{X}$ | B E B $\quad 1118 \mathrm{x}$ ¢ | B $\quad 1$1 1 |  |
| B m B X X X 1 1 1 X X | B B B X X X 1 1 1 X X X | X |  |
| B B B X X X X X X X | B B B X X X X X X X | $\mathrm{x} \times \mathrm{XXXXXX}$ | x x XXXXXX |
| 40. Move Q: | 41. Move 6: | 42. Move 5: | 43. Move 1: |
| $2 \begin{array}{llllll}2 & 2 & 3 & 3\end{array}$ | 2223318 A A A \$ \$ \$ | $2 \begin{array}{lllllll}2 & 2 & 3 & 3 & \text { A A A \$ \$ \$ }\end{array}$ | $\begin{array}{llllll}2 & 2 & 2 & 3 & 3 & \text { A A A \$ \$ \$ }\end{array}$ |
|  |  | $\begin{array}{llllll}2 & 2 & 2 & 3 & 3 & 3\end{array}$ |  |
| 222 A A A 444 | 222 A A A 444 | 222 A A A 44 | 222111 A A A 444 |
| $\begin{array}{lllll}5 & 5 & 666\end{array}$ | 555 666 | 555666 | 111555666 |
| B B B 5 ¢ 5 5 666 | B 555 | B $\quad 55566$ | B $\quad 555666$ |
| B B B 55566 | B B B 555666 | B B B 55566 | B B B $\quad 50566$ |
|  |  |  |  |
|  | $\mathrm{X} \times \mathrm{X} \times 111 \times \mathrm{l}$ | $\mathrm{x} \times \mathrm{X} \times 111 \mathrm{l}$ |  |
|  |  |  | $\mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x} 808$ |
| 44. Move B: | 45. Move 1: | 46. Move 2: | 47. Move 3: |
| $\begin{array}{lllllll}2 & 2 & 2 & 3 & 3 & \mathrm{~A} & \mathrm{~A}\end{array} \mathrm{~A}$ \$ \$ \$ | $\begin{array}{llllllll}2 & 2 & 2 & 3 & 3 & \text { and a } \\ \text { A }\end{array}$ | 3 3 ¢ A A \$ \$ \$ | $\begin{array}{llll}3 & 3 & 3 & \text { A A A \$ \$ \$ }\end{array}$ |
| $2 \begin{array}{llllll}2 & 2 & 3 & 3 & \text { A A A } 444\end{array}$ | $\begin{array}{llllll}2 & 2 & 2 & 3 & 3 & 3\end{array}$ | 3 3 A A A 444 | 333 AnA444 |
| 2221118 A A 4.44 | 222 A A A 444 | 222 A A A 44 | 222 AAA444 |
| $\begin{array}{llllllllll}1 & 1 & 1 & 5 & 5 & 5 & 6 & 6\end{array}$ | 5 5 55666 | $\begin{array}{lll}2 & 2 & 2\end{array}$ | 222 |
| 555666 | 555666 | 22255566 | 22255566 |
| В в B 555666 | 555666 | $1 \begin{array}{lllllll}1 & 1 & \text { B B } 55 & 56\end{array}$ | 1118 B ¢ 1 ¢ 555666 |
| B B B X X 292 |  | 111 BBBXXXXQQ |  |
| $X \times \mathrm{XBBBXXXQQ} 9$ | XXXBBBXXX 090 | XXXBEBXXXQQ 0 |  |
| $\mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x} \times 888$ | $\mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x} 8888$ | $\mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x} \times 888$ | x $\mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x} 8 \mathrm{8} 8$ |
| 48. Move A: | 49. Move 4: | 50. Move 5: | 51. Move 6: |
| $3 \begin{array}{lll}3 & 3\end{array}$ | $\begin{array}{lllllllll}3 & 3 & 3 & 4 & 4 & 4\end{array}$ | $\begin{array}{lllllllllllll}3 & 3 & 3 & 4 & 4 & 4 & 5 & 5 & 5\end{array}$ | $\begin{array}{llllllllllllll}3 & 3 & 3 & 4 & 4 & 4 & 5 & 5 & 5\end{array}$ |
| 333 l | $\begin{array}{llllllll}3 & 3 & 3 & 4 & 4 & 4\end{array}$ | $\begin{array}{lllllllll}3 & 3 & 3 & 4 & 4 & 4 & 5 & 5 & 5\end{array}$ | $\begin{array}{llllllllll}3 & 3 & 3 & 4 & 4 & 4 & 5 & 5 & 5\end{array}$ |
| 222 A A A 444 | 222 AAA | 22 A A A 555 | 222 A A A 55 |
| 222 A A A 555666 | 222 A A A 5 5 5 6 6 6 | 222 A A A 666 | 2 2 2 A A A 66 |
| 222 A A A 5 5 5 6 6 6 | 222 A A A 555666 | 222 A A A 666 | 222 A A A 66 |
| 1 1 1 B B B 555666 | $1 \begin{array}{llllllllll}1 & 1 & \text { B B } & 5 & 5 & 5666\end{array}$ | $\begin{array}{lll}11 & \text { B B B } & 666\end{array}$ | $\begin{array}{lllllllll}1 & 1 & \text { B B B } & 6 & 6\end{array}$ |
|  |  |  | 1 1 1 B B B X X X Q Q Q |
|  |  | X X X B B B X X X Q Q Q |  |
|  | $\mathrm{x} \times \mathrm{xXx} \mathrm{\times x} \mathrm{\times x} 808$ | $\mathrm{x} \times \mathrm{xXx} \mathrm{\times x} \mathrm{\times x} 908$ |  |

## Shimokita Solution, 1 -> 2 (page 1/2)

Here is a solution of 50 rectilinear moves ( 69 straight-line moves):

| $\begin{array}{lllllllllllllll}0: & \\ 3 & 3 & 3 & 4 & 4 & 4 & 5 & 5 & 5 & \$\end{array}$ | 1. Move 6: | 2. Move 5: | 3. Move 4: ${ }_{3}$ \$ \$ |
| :---: | :---: | :---: | :---: |
| 3 3 | $333444555 \$ \$ \$$ | $333444 \quad \$ \$ \$$ | $333$ $\$ \$ \$$ |
| $\begin{array}{llllllllll}3 & 3 & 3 & 4 & 4 & 4 & 5 & 5 & 5\end{array}$ | $\begin{array}{llllllllll}3 & 3 & 3 & 4 & 4 & 4 & 5 & 5 & 5\end{array}$ | $\begin{array}{lllllll}3 & 3 & 3 & 4 & 4 & 4\end{array}$ | 3 3 |
| $222 Q Q Q 55$ | $222 Q Q Q 55$ | 222 Q 2 Q | 222 QQQ $\quad 444$ |
| $222 Q Q Q 66$ | $222 Q Q Q 66$ | $222 Q Q Q 555666$ | $222 Q Q Q 555666$ |
| 22290666 | $2220 Q Q 666$ | $222 Q Q Q 555666$ | $222 Q Q Q 555666$ |
|  | $\begin{array}{lllll}111 & \text { B B B }\end{array}$ | $\begin{array}{lllllllllllllll}1 & 1 & \text { B B } & 5 & 5 & 6 & 6\end{array}$ |  |
|  | 111 BBBXXXAAA | 111 BBBXXXAAA | 111 BBBXXXAAA |
|  |  | B B X X A A A |  |
| $\mathrm{x} \times \mathrm{xXXXXXXAnA}$ |  | $\mathrm{x} \mathrm{x} \times \mathrm{xXXXXXXAX}$ |  |
| 4. Move Q: | 5. Move 2: | 6. Move 1: | 7. Move B: |
| $\begin{array}{lll}3 & 3 & 3\end{array}$ | $\begin{array}{llll}3 & 3 & 3 & Q Q Q \$ \$ \$\end{array}$ | $\begin{array}{llll}3 & 3 & 3 & Q Q Q \$ \$ \$\end{array}$ | $\begin{array}{llll}3 & 3 & 3 & Q Q Q \$ \$ \$\end{array}$ |
| $\begin{array}{llll}3 & 3 & 3 & Q 29444\end{array}$ | 333222090444 | $\begin{array}{lllllll}3 & 3 & 3 & 2 & 2 & 2 & 9\end{array}$ |  |
| $\begin{array}{lll}222 & 290444\end{array}$ | 222909444 |  | $\begin{array}{llllllll}1 & 1 & 2 & 2 & 2 & 9 & 9 & 4\end{array}$ |
| $\begin{array}{lll}222 & 5 & 5 \\ 2 & 5666\end{array}$ | 22555666 | $\begin{array}{lllllllllllll}1 & 1 & 1 & 2 & 2 & 2 & 5 & 5 & 5 & 6 & 6\end{array}$ |  |
| 22250566 | $\begin{array}{llllll}5 & 5 & 5 & 6\end{array}$ | 5556666 | B B B $\quad 5 \quad 55666$ |
| 111 B B B 555666 | $1118 B 8555666$ | 555666 | B B B $\quad 5 \quad 55666$ |
| 111 BBBXXXAA ¢ | B B ¢ X X A A | $x \times x \mathrm{~A} A$ | B B B $\quad \mathrm{XXXAAA}$ |
| XXXBBBXXXAAA | XXXBBBXXXAAA | X X X B B B X X A A A | $\mathrm{x} \mathrm{XX} \quad \mathrm{XXXAAA}$ |
| XXXXXXXXXAAA | X XXXXXXXXAA | XXXXXXXXXAAA | $\mathrm{x} \times \mathrm{XXXXXX} \mathrm{X}$ ¢ A A |
| 8. Move 2: | 9. Move Q: | 10. Move 5: | 11. Move 2: |
| 3330 | 333 Q Q Q \$ \$ \$ | $333 Q Q Q 555 \$ \$ \$$ | $333 Q Q Q 555$ \$ \$ \$ |
| $\begin{array}{lll}3 & 3 & \text { Q Q Q }\end{array}$ | $333 Q Q Q 4$ | $\begin{array}{llll}3 & 3 & 3 & Q\end{array}$ |  |
|  | $\begin{array}{lll}111 & 1\end{array}$ |  |  |
| $\begin{array}{lllllllllllll}1 & 1 & 1 & 2 & 2 & 2 & 5 & 5 & 5 & 6 & 6 & 6\end{array}$ | $\begin{array}{lllllllllllll}1 & 1 & 1 & 2 & 2 & 2 & 5 & 5 & 5 & 6 & 6 & 6\end{array}$ | $\begin{array}{lll}122 & 2 & 666\end{array}$ | $\begin{array}{llllll}1 & 1 & 2 & 2 & 2666\end{array}$ |
| B B B 2222555666 | B B B 22225550666 | В B B 222666 | B B B $\quad 222666$ |
| B B B 2222555666 |  | B B B 222 \% 666 | B B B $\quad 222666$ |
| B B B $\quad \mathrm{x} \times \mathrm{x}$ A A A | B B B $\quad$ ¢ BXAAA | B B B $\quad$ X BXAAA | B B B $\quad \mathrm{XXXAAA}$ |
|  |  |  |  |
| XXXXXXXXXAAA | XXXXXXXXXAA A | XXXXXXXXXAAA | XXXXXXXXXAAA |
| 12. Move Q: | 13. Move 1: | 14. Move 3: | 15. Move B: |
| $333 \quad 555 \$$ | $3 \begin{array}{llllllllllll}3 & 3 & 3 & 1 & 1 & 1 & 5 & 5 & 5 & \$\end{array}$ | $11.155505 \$$ | 1115555 |
| $\begin{array}{llll}3 & 3 & 3 & 5 \\ 1 & 5 & 5 & 4\end{array}$ | $\begin{array}{lllllllllllllll}3 & 3 & 3 & 1 & 1 & 1 & 5 & 5 & 5 & 4 & 4 & 4\end{array}$ | 1555544 |  |
|  | $\begin{array}{llllll}5 & 5 & 5 & 4 & 4 & 4\end{array}$ | $\begin{array}{lllllll}5 & 5 & 5 & 4 & 4\end{array}$ |  |
| $\begin{array}{llll}1 & 1 & 1 & 222666\end{array}$ | $2 \begin{array}{llllll}2 & 2 & 6 & 6\end{array}$ | $\begin{array}{lllllllll}3 & 3 & 3 & 2 & 2 & 2 & 6 & 6 & 6\end{array}$ |  |
| B B B Q Q 222666 | B B B Q Q Q 222666 | B B B Q Q Q 222666 | Q Q Q 2226666 |
| B B B Q Q 222666 | B B B Q Q Q 2 26666 | B B B Q Q Q 222666 | QQQ 2226666 |
| B B B Q Q Q X X A A A A |  | B B B Q Q Q X X X A A A | Q Q Q X X X A A A |
|  | $\mathrm{x} \times \mathrm{x}$ ¢ $\mathrm{x} \times \mathrm{x}$ A A |  | $x \mathrm{x} \times \mathrm{x}$ ¢ x A A A |
| $\mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x}$ A A |  | $\mathrm{x} \mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{AAA}$ |  |
| $\begin{aligned} & \text { 16. Move } Q: \\ & 1 \\ & 1 \end{aligned} 15$ | $\begin{gathered} \text { 17. Move } 3: \\ 1 \\ 1 \end{gathered} 1$ | 18. Move 1: 555 s \$ | 19. Move 5: <br> 555 <br> \$ \$ \$ |
|  |  | В в B $\quad 555444$ | B B B 555 S 544 |
| $\begin{array}{llllllllllllllll}\text { B } & \text { B } & 3 & 3 & 3 & 5 & 5 & 5 & 4 & 4 & 4\end{array}$ | $\begin{array}{ll}\text { B B } & 555444\end{array}$ | B B B $\quad 55544$ | B B B 555 [ 5 4 4 |
| B B B 333 | B B B $\quad 222666$ |  | B B B 11111122220666 |
| QQQ $\quad 222666$ | QQQ $\quad 222666$ | Q Q Q 111112222666 | Q Q Q 111112222666 |
| QQQ 222666 | Q Q Q 3 3 32222666 | Q Q Q 3 3 32222666 |  |
|  | Q Q Q $333 \mathrm{x} \times \mathrm{x}$ A A A | Q Q Q 33 SXXXAAA | Q Q Q $33 \mathrm{3} \times \mathrm{x}$ ¢ A A |
| XXXX XXXXA ¢ | XXXX XXXAA | XXXXXXXAA | $\mathrm{x} \mathrm{x} \times \mathrm{x}$ ¢ x A A A |
|  | XXXXXXXXXAAA | XXXXXXXXXAAA | XXXXXXXXXAAA |
| $\text { 20. Move } 2: 1$ | 21. Move $\begin{array}{r}6: \\ 5 \\ 5 \\ 5\end{array} 222 \$ \$ \$$ | 22. Move $\mathrm{A}:$ $555222 \$ \$ \$$ | $\text { 23. Move X: } \quad \begin{array}{lllll} 5 & 5 & 2 & 2 & \$ \end{array}$ |
|  |  |  |  |
| B B B 5 5 515 |  |  |  |
|  |  |  | B $\quad$ B B 11 |
| Q Q Q 111 1.666 | Q Q Q 111115666 | $\mathrm{Q} Q \mathrm{Q} 1 \mathrm{I}_{1} 115666 \mathrm{AAA}$ | Q Q Q 1 1 1 6666 AAA |
| Q Q Q 3 3 $\quad 666$ |  | $\mathrm{Q} Q \mathrm{Q} 3 \mathrm{3} 3 \mathrm{C}$ 6 6 AAA | Q Q Q 333666 A A A |
| QQQ $\mathrm{Q}^{3} 3 \mathrm{XXXAXA}$ | QQQ $\mathrm{Q}^{3} 3 \mathrm{XXXAXA}$ | Q Q Q 333 XXX |  |
|  |  |  |  |
| XXXXXXXXXAXA | X X X X X X X X X A A A | $\mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x}$ x | XXXXXXXXXX |
| 24. Move 6: | 25. Move 1: | 26. Move Q: | 27. Move B: |
| 555222 \$ \$ \$ | $\begin{array}{llllllll}5 & 5 & 5 & 2 & 2 & 2\end{array}$ | $5552222 \% \$ \$$ | $\begin{array}{lllllllll}5 & 5 & 5 & 2 & 2 & 2 & \$\end{array}$ |
|  |  | $\begin{array}{llllllllllllll}\text { B } & \text { B } & \mathrm{F} & 5 & 5 & 2 & 2 & 2 & 4 & 4\end{array}$ | $\begin{array}{llllllllll}5 & 5 & 5 & 2 & 2 & 2 & 4 & 4 & 4\end{array}$ |
| B B B 5 ¢ 5 5 22224 |  | $\begin{array}{llllllllllllllll}\text { B } & \text { B } & 5 & 5 & 5 & 2 & 2 & 2 & 4 & 4 & 4\end{array}$ | $\begin{array}{lllllllllll}5 & 5 & 5 & 2 & 2 & 2 & 4 & 4 & 4\end{array}$ |
| B B B 11118 | B B B 1118 AAA | B B B 111 AAA | B B B $\quad 1118$ A A |
| QQQ111 Q ¢ A A | QQQ $\quad 1118 \mathrm{~A}$ ¢ | A A A | B B B 11118 Al |
| Q Q Q 3 3 3 6 6 6 A A A | Q Q Q 3 3 $\quad 6666 \mathrm{ARA}$ | 3336663  <br> 3  | $\begin{array}{lllllllllllll}\text { B } & \text { B } & 3 & 3 & 3 & 6 & 6 & \text { A A A }\end{array}$ |
| $\mathrm{Q} Q \mathrm{Q} \mathrm{B}^{3} 336666 \mathrm{X} \times \mathrm{X}$ | $Q Q Q 333666 \times X X$ | $\mathrm{Q} Q \mathrm{Q} 3 \mathrm{3} 3 \mathrm{6} 66 \mathrm{XXXX}$ |  |
| $\mathrm{x} \times \mathrm{X} 666 \mathrm{x} \times \mathrm{x}$ | $\mathrm{x} \times \mathrm{x} 666 \mathrm{x} \times \mathrm{x}$ |  |  |
|  | XXXXXXXXX | Q $8.8 \mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x}$ |  |

Shimokita Solution, 1 -> 2 (page 2/2)

|  | $\left.\begin{array}{lllllllllll}29 & \text { 29 } & \text { Move } & 2: & & & & & & \\ 5 & 5 & 5 & & & & & & & \$ & \$ \\ 5 & 5 & 5 & & & & & & & 4 & 4\end{array}\right]$ |  |  |
| :---: | :---: | :---: | :---: |
| 32 Move 6           <br> 5 5 5 4 4 4 6 6 6 $\$$ $\$$ $\$$  <br> 5 5 5 4 4 4 6 6 6 1 1 1  <br> 5 5 5 2 2 2 6 6 6 1 1 1  <br> $B$ $B$ $B$ 2 2 2    $A$ $A$ $A$  <br> $B$ $B$ $B$ 2 2 2    $A$ $A$ $A$  <br> $B$ $B$ $B$ 3 3 3    $A$ $A$ $A$  <br> $Q$ $Q$ $Q$ 3 3 3    $X$ $X$ $X$  <br> $Q$ $Q$ $Q$ $X$ $X$ $X$    $X$ $X$ $X$  <br> 0 $Q$ $Q$ $X$ $X$ $X$ $x$ $X$ $X$ $X$ $X$ $X$  <br>              | 3 3 Move 3 $:$        <br> 5 5 5 4 4 4 6 6 6 $\$$ $\$$ $s$ <br> 5 5 5 4 4 4 6 6 6 1 1 1 <br> 5 5 5 2 2 2 6 6 6 1 1 1 <br> $B$ $B$ $B$ 2 2 2    $A$ $A$ $A$ <br> $B$ $B$ $B$ 2 2 2    $A$ $A$ $A$ <br> $B$ $B$ $B$       $A$ $A$ $A$ <br> $Q$ $Q$ $Q$    3 3 3 $x$ $X$ $X$ <br> $Q$ $Q$ $Q$ $X$ $X$ $x$ 3 3 3 $X$ $X$ $X$ <br> $Q$ 0 $Q$ $X$ $X$ $X$ $X$ $X$ $X$ $X$ $X$ $X$ |  |  |
| $\begin{array}{\|llllllllll} \hline 36 & \text { Move } & Q & : & & & & & \\ 5 & 5 & 5 & 4 & 4 & 4 & 6 & 6 & 6 & \$ \\ \hline \end{array}$ | $\left.\begin{array}{\|lllllllllll} \hline 37 & \text { Move } & X & & & & & & \\ 5 & 5 & 5 & 4 & 4 & 4 & 6 & 6 & 6 & \$ & \$ \\ \$ \\ 5 & 5 & 5 & 4 & 4 & 4 & 6 & 6 & 6 & 1 & 1 \\ 1 \\ 5 & 5 & 5 & & & & 6 & 6 & 6 & 1 & 1 \\ 1 \\ Q & Q & Q & B & B & B & 2 & 2 & 2 & A & A \\ A \\ Q & Q & Q & B & B & B & 2 & 2 & 2 & A & A \\ A \\ Q & Q & Q & B & B & B & 2 & 2 & 2 & A & A \end{array}\right]$ | 38 Move $A$          <br> 5 5 5 4 4 4 6 6 6 $\$$ $\$$ $\$$ <br> 5 5 5 4 4 4 6 6 6 1 1 1 <br> 5 5 5    6 6 6 1 1 1 <br> $Q$ $Q$ $Q$ $B$ $B$ $B$ 2 2 2    <br> $Q$ $Q$ $Q$ $B$ $B$ $B$ 2 2 2    <br> $Q$ $Q$ $Q$ $B$ $B$ $B$ 2 2 2    <br> $X$ $X$ $X$ 3 3 $X$ $X$ $X$ $A$ $A$ $A$  <br> $X$ $X$ 3 3 3 $X$ $X$ $X$ $A$ $A$ $A$  <br> $X$ $X$ $X$ $X$ $X$ $X$ $X$ $X$ $A$ $A$ $A$  | 39 Move 2 $:$         <br> 5 5 5 4 4 4 6 6 6 $\$$ $\$$ $\$$ <br> 5 5 5 4 4 4 6 6 6 1 1 1 <br> 5 5 5    6 6 6 1 1 1 <br> $Q$ $Q$ $Q$ $B$ $B$ $B$    2 2 2 <br> $Q$ $Q$ $Q$ $B$ $B$ $B$    2 2 2 <br> $Q$ $Q$ $Q$ $B$ $B$ $B$    2 2 2 <br> $X$ $X$ $X$ 3 3 3 $X$ $x$ $X$ $A$ $A$ $A$ <br> $X$ $X$ 3 3 $X$ $X$ $X$ $A$ $A$ $A$   <br> $X$ $X$ $X$ $X$ $X$ $X$ $X$ $X$ $A$ $A$ $A$  |
| 40 Move B:          <br> 5 5 5 4 4 4 6 6 6 $\$$ $\$$ $\$$ <br> 5 5 5 4 4 4 6 6 6 1 1 1 <br> 5 5 5    6 6 6 1 1 1 <br> $Q$ $Q$ $Q$    $B$ $B$ $B$ 2 2 2 <br> $Q$ $Q$ $Q$   $B$ $B$ $B$ 2 2 2  <br> $Q$ $Q$ $Q$    $B$ $B$ $B$ 2 2 2 <br> $X$ $X$  3 3 3 $X$ $X$ $X$ $A$ $A$ $A$ <br> $X$ $X$ $X$ 3 3 3 $X$ $X$ $X$ $A$ $A$ $A$ <br>  $X$  $X$ $X$ $X$ $X$ $X$ $X$ $A$ $A$ $A$ |  Al Move $4:$         <br> 5 5 5   6 6 6 $\$$ $\$$ $\$$  <br> 5 5 5   6 6 6 1 1 1  <br> 5 5 5    6 6 6 1 1 1 <br> 0 $Q$ $Q$ 4 4 4 $B$ $B$ $B$ 2 2 2 <br> $Q$ 2 $Q$ 4 4 4 $B$ $B$ $B$ 2 2 2 <br> $Q$ $Q$ $Q$    $B$ $B$ $B$ 2 2 2 <br> $X$  3 3 3 $X$ $X$ $X$ $A$ $A$ $A$  <br> $X$ $X$ $X$ 3 3 3 $X$ $X$ $X$ $A$ $A$ $A$ <br> $X$ $X$ $X$ $X$ $X$ $X$ $X$ $X$ $X$ $A$ $A$ $A$ | 42. Move 5 5 5 5 6 6 6 $\$$ $S$ $S$ <br>    5 5 5 6 6 6 1 1 1 <br>    5 5 5 6 6 6 1 1 1 <br> 0 $Q$ $Q$ 4 4 4 $B$ $B$ $B$ 2 2 2 <br> $Q$ $Q$ $Q$ 4 4 4 $B$ $B$ $B$ 2 2 2 <br> $Q$ $Q$ $Q$    $B$ $B$ $B$ 2 2 2 <br> $X$   3 3 3 $X$ $X$ $X$ $A$ $A$ $A$ <br> $X$ $X$ $X$ 3 3 3 $X$ $X$ $X$ $A$ $A$ $A$ <br> $X$ $X$ $X$ $X$ $X$ $X$ $X$ $X$ $X$ $A$ $A$ $A$ | $\begin{array}{\|llllllllllll} \hline 43 & \text { Move } & \mathrm{Q}: & & & & & & \\ Q & Q & Q & 5 & 5 & 5 & 6 & 6 & 6 & \$ & \$ & \$ \\ Q & Q & Q & 5 & 5 & 5 & 6 & 6 & 6 & 1 & 1 & 1 \\ Q & Q & Q & 5 & 5 & 5 & 6 & 6 & 6 & 1 & 1 & 1 \\ & & 4 & 4 & 4 & B & B & B & 2 & 2 & 2 \\ & & 4 & 4 & 4 & B & B & B & 2 & 2 & 2 \\ & & & & & & B & B & B & 2 & 2 & 2 \\ & & & 3 & 3 & 3 & X & X & X & A & A & A \\ \mathrm{X} & \mathrm{X} & \mathrm{X} & 3 & 3 & 3 & \mathrm{X} & \mathrm{X} & \mathrm{~A} & \mathrm{~A} & \mathrm{~A} \\ \mathrm{X} & \mathrm{X} & \mathrm{X} & \mathrm{X} & \mathrm{X} & \mathrm{X} & \mathrm{X} & \mathrm{X} & \mathrm{X} & \mathrm{~A} & \mathrm{~A} & \mathrm{~A} \\ \hline \end{array}$ |
|  | 45 Move 4          <br> $Q$ $Q$ $Q$ 5 5 5 6 6 6 $\$$ $\$$ $\$$ <br> $Q$ $Q$ $Q$ 5 5 5 6 6 6 1 1 1 <br> $Q$ $Q$ $Q$ 5 5 5 6 6 6 1 1 1 <br> 3 3 3    $B$ $B$ $B$ 2 2 2 <br> 3 3 3    $B$ $B$ $B$ 2 2 2 <br> 4 4 4    $B$ $B$ $B$ 2 2 2 <br> 4 4 4    $X$ $X$ $X$ $A$ $A$ $A$ <br> $X$ $x$ $X$    $X$ $X$ $X$ $A$ $A$ $A$ <br> $X$ $x$ $x$ $x$ $x$ $x$ $x$ $X$ $x$ $A$ $A$ $A$ |  |  |
| 48 Mover 1 $:$         <br> $Q$ $Q$ $Q$ 1 1 1    $\$$ $\$$ $\$$ <br> $Q$ $Q$ $Q$ 1 1 1       <br> $Q$ $Q$ $Q$ 6 6 6       <br> 3 3 3 6 6 6 $B$ $B$ $B$ 2 2 2 <br> 3 3 3 6 6 6 $B$ $B$ $B$ 2 2 2 <br> 4 4 4 5 5 5 $B$ $B$ $B$ 2 2 2 <br> 4 4 4 5 5 5 $X$ $X$ $X$ $A$ $A$ $A$ <br> $X$ $X$ $X$ 5 5 5 $X$ $X$ $X$ $A$ $A$ $A$ <br> $X$ $X$ $X$ $X$ $X$ $X$ $X$ $X$ $X$ $A$ $A$ $A$ |  |  |  |

## Shimokita Solution， 2 －＞ 3 （page 1／2）

Here is a solution of 58 rectilinear moves（ 81 straight－line moves）：

| 0： | 1．Move 2： | 2．Move B： | 3．Move 1： |
| :---: | :---: | :---: | :---: |
| QQQ 111 B B B \＄\＄\＄ | QQQ1118BES \＄\＄ | Q Q Q 1111 1 | Q Q Q \＄\＄ |
| $Q \mathrm{Q} Q 111 \mathrm{BB}$ B | Q Q Q 111 BB B | Q Q Q 1 1 1 | $\begin{array}{ll}Q Q Q & 111\end{array}$ |
| Q Q Q 666 B B B | $Q Q Q 666 \mathrm{BBB}$ | Q Q 2666 | Q Q Q 66661111 |
| $\begin{array}{llllllllll}3 & 3 & 3 & 6 & 6 & 6 & 2 & 2 & 2\end{array}$ | $\begin{array}{llllll}3 & 3 & 3 & 6 & 6 & 2\end{array}$ |  | $\begin{array}{llllllllllllll}3 & 3 & 3 & 6 & 6 & 6 & \text { B B B } 222\end{array}$ |
| $\begin{array}{llllllllll}3 & 3 & 3 & 6 & 6 & 6 & 2 & 2 & 2\end{array}$ | 3 3 | 333666 B B B 22 |  |
| 444555222 | 444555 | 444555 В В В 22 | 444555 В В В 222 |
| $444555 \times \mathrm{XXAA}$ A | $444555 \times \mathrm{xXAA}$ A | $444555 \times \mathrm{CXAA}$ | $444555 \times \mathrm{XXAA}$ A |
| $\mathrm{XXX5} 55 \times \mathrm{XXAA}$ A | $\mathrm{XXX5} 55 \mathrm{x} \times \mathrm{x}$ A A A | $\mathrm{XXX5} 55 \mathrm{x} \times \mathrm{x}$ A $\mathrm{A}^{\text {¢ }}$ | $\mathrm{x} \times \mathrm{x} 55 \mathrm{x} \times \mathrm{XAA}$ A |
| XXXXXXXXXAAA | XXXXXXXXXAAA | XXXXXXXXXAAA | x XXXXXXXXAAA |
| 4．Move 6： | 5．Move 5； | 6．Move 3： | 7．Move 5： |
| Q Q Q $\quad 666 \$ \$ \$$ |  | $Q Q Q 5555666 \$ \$$ | Q Q Q $\quad 666 \$ \$ \$$ |
|  | QQQ $\mathrm{Q}_{\text {Q }}^{\text {Q }} 5$ | Q Q Q 5 5 5 6 6 6 1 1 1 | Q Q Q $\quad 666111$ |
| QQQ $\mathrm{Q}^{\text {Q }}$ | Q Q Q 5 5 5 6 6 6 1 1 1 | $Q Q Q 55566611$ | Q Q Q $\quad 6661111$ |
|  |  | B B B 22 | 555 B B B 222 |
| 33 | 333 B B B 222 | B B B 22 | 555 B B B 222 |
| 444555 B B B 222 | $444 \begin{aligned} & 4 \\ & 4\end{aligned}$ | 444 | 444555 B B B 222 |
| $444555 \times \mathrm{CXXAA}$ A | 444 | 444333 XXXAA | 444333 XXXXAAA |
| X X X $555 \times \mathrm{x} \times \mathrm{A}$ ¢ A | $\mathrm{x} \times \mathrm{x}$（ $\mathrm{x} \times \mathrm{xAAA}$ | $\mathrm{x} \times \mathrm{X} 333 \mathrm{XXXAN}$ | $\mathrm{x} \times \mathrm{X} 333 \mathrm{XXXAA}$ |
| $\mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{ARA}$ |  | x $\mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x}$ A A | $\mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x}$ A A |
| 8．Move Q： | 9．Move 4： | 10．Move 5： | 11．Move B： |
| Q Q Q 666 S \＄\＄ | 444 C Q $2666 \$ \$ \$$ | 444 QQQ ¢ 6.6 \＄ | 444 Q Q Q 666 F \＄\＄ |
| Q Q Q 666661111 | 4444098066661111 | 4444098666611 |  |
|  | Q Q Q 6661111 | $555 Q 8 Q 66611$ |  |
| 5 5 5 B B B 222 | 5 S 5 B B B 222 | 555 | $555 \mathrm{BBB} \quad 222$ |
| 555 B B B 222 | 55 B B B 22 | 555 | $555 \mathrm{BBB} \quad 222$ |
| 444555 日 В В 2222 | 555 B B B 222 | B B B 22 | B B B 222 |
| $444333 \times \mathrm{CXXANA}$ | 333 XXXAA A | 333 XXXAN | 333 XXXAAA |
| XXX 333 XXXAA A | XXX 333 XXXAA A | $\mathrm{XXX3} 33 \mathrm{XXXAAA}$ | $\mathrm{x} \times \mathrm{X} 333 \mathrm{XXXAAA}$ |
|  | $\mathrm{x} \times \mathrm{XXXXXXXAAA}$ |  | X XXXXXXXXXAA |
| 12．Move 6： | 13．Move Q： | 14．Move 4： | 15．Move 5： |
| 444929 \＄\＄ | 444020 | 44 Q Q C \＄\＄ | 5 5 5 5 444 4 Q Q Q \＄\＄\＄ |
| 4449291 | 4444 | 4 Q Q Q 1 |  |
| $\begin{array}{rcc}5 & 5 \\ 5 & 5 & \text { Q Q }\end{array}$ |  |  | 5 5 |
| $\begin{array}{llllllllllll}5 & 5 & 5 & \mathrm{~B} & \mathrm{~B} & \mathbf{6} & 6 & 6 & 2 & 2 & 2\end{array}$ |  | $\begin{array}{llllllllllllll}5 & 5 & \text { B B B } & 6 & 6 & 6 & 2 & 2 & 2\end{array}$ | B B B 6666222 |
| 555 B B B 6666222 | 555 B B B 6666222 | 555 B B B 666222 | В В В 666222 |
| В В B666222 | B B E 666222 | B B E 666222 | B B B 666222 |
| 333 XX | 333 XXXAAA | 333 XXXAA | 333 XXXAAA |
|  |  | $\mathrm{xXX3} 33 \mathrm{XXXARA}$ |  |
|  |  |  |  |
| 16．Move B： | 17．Move 6： | 18．Move 2： | 19．Move A ： |
| 5 5 5 5 4.44 4 ¢ Q Q \＄\＄\＄ | 5 5 5 5 4.44 4 Q Q Q \＄\＄\＄ | 5 5 5 5 4.44 4 ¢ Q Q \＄\＄\＄ | 5 5 5 5 4.44 4 Q Q Q \＄\＄\＄ |
|  |  | 5 5 |  |
| 5550 | 555 | 555 | 555 |
| 666222 | 666222 | 666222 | 666222 A A A |
| B B B $\quad 666222$ | в в в 6666222 | В в в 666222 | В В В $666222 \begin{array}{ll}\text { A A A }\end{array}$ |
|  | B B B $666 \quad 222$ | В В В 6666222 | В В В $666222 \begin{aligned} & \text { A A A }\end{aligned}$ |
| B в в 333 XXXAAA |  |  | B B B $33^{3} 3 \mathrm{XXX}$ |
| XXX 333 XXXAAA | XXX 333 XXXAA A | XXX 333 XXXAA A |  |
| $\mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x}$ A A A |  | х $\mathrm{x} \times \mathrm{x} \times \mathrm{x} \times \mathrm{x}$ A A |  |
| 20．Move $X$ ： | 21．Move B： | 22．Move 6： | 23．Move 2： |
|  | 5 5 5 5 4.44 4 Q Q Q \＄\＄\＄ | 5 5 5 5 4.44 4 Q Q Q \＄\＄\＄ | $\begin{array}{llllllll}5 & 5 & 5 & 4 & 4 & 4 & Q & Q\end{array}$ |
|  |  |  |  |
| 555 | 555 | 555 |  |
| $666222 \mathrm{~A} A \mathrm{~A}$ | 6222 AAA | 666 | 6662220 A A A |
| B B B 666222 AAA | 66222 AAA | 66622 AA | 666222 A A A |
| B B B 666222 AAA | 666222 A A A | $66622 \begin{aligned} & \text { ¢ A A }\end{aligned}$ | 666 A A A |
| B B E $\quad 333 \mathrm{XXX}$ |  | 且的 $\quad 333 \mathrm{XXX}$ | B B B $\quad 333 \mathrm{XXX}$ |
| $\mathrm{x} \times 333 \mathrm{x} \times \mathrm{x}$ |  |  |  |
| $\mathrm{x} \mathrm{x} \times \mathrm{XXXXXX}$ | B B B X X X X X X X | B B B X X X X X X X | B B B X X X X X X X |
| 24．Move 3： | 25．Move A： | 26．Move 1： | 27．Move Q： |
|  |  |  | 5 5 5 4 4 4 $\$$ |
|  |  |  | $\begin{array}{llllllll}5 & 5 & 5 & 4 & 4 & 4 & Q Q Q\end{array}$ |
| $\begin{array}{lllllll}5 & 5 & 5 & 2 & 2 & 2 & Q\end{array}$ | 55552220921 | $\begin{array}{lllllll}5 & 5 & 5 & 2 & 2 & 2\end{array}$ | 5 5 522222000 |
| 666222 A A A | 66622 | 666222 | 666222009 |
| 6662220 A A A | $\begin{array}{llllllll}6 & 6 & 6 & 2 & 2 & 2\end{array}$ | 6 6 622222011 | $\begin{array}{llllllll}6 & 6 & 6 & 2 & 2 & 2 & 1 & 1\end{array}$ |
| $\begin{array}{llll}6 & 6 & 3 & 3\end{array}$ | 666333 $\mathrm{~A}^{6}$ A A | $\begin{array}{lllllll}6 & 6 & 6 & 3 & 3 & 3 & \text { A A A }\end{array}$ |  |
| $\begin{array}{lllllll}\text { B B B } & 3 & 3\end{array}$ | B B B $33^{\text {S A A A X X X }}$ | B B B $33^{\text {B A A A X X }}$ | B B B 333 A A AXXX |
| B B B X X X B B | B B B X X A A A X X X | B B BXXXAAAXX | B B B X X X A A A X X |
|  |  |  |  |

Shimokita Solution, 2 -> 3 (page 2/2)

| \#28. Move 4: |  |  |  |
| :---: | :---: | :---: | :---: |
| 132. Move 1: | 133. Move 3: |  |  |
| \#36. Move 3: | 437. Move A: | 438. Nove 6: |  |
| 140. Move 2: | $\left.\begin{array}{lllllllllll}\hline & 41 & \text { Move } & 3 & \text { : } & & & & & & \\ 2 & 2 & 2 & 3 & 3 & 3 & & & & \$ & \$ \\ \hline & 2 & 2 & 3 & 3 & 3 & & & & 4 & 4 \\ \hline\end{array}\right]$ | 842. Move A: |  4 3 Move $6:$        <br> 2 2 2 3 3 3 A A A $\$$ $\$$ $\$$ <br> 2 2 2 3 3 3 A A A 4 4 4 <br> 2 2 2    A A A 4 4 4 <br> 5 5 5    6 6 6 Q Q Q <br> 5 5 5    6 6 6 $Q$ $Q$ Q <br> 5 5 5    6 6 6 $Q$ $Q$ $Q$ <br> B B B    1 1 1 X X X <br> B B B X X X 1 1 1 X X X <br> B B B X X X X X X X X X |
| 144. Move 5: <br> $\begin{array}{lllllllllll}2 & 2 & 2 & 3 & 3 & 3 & A & A & \$ & \$\end{array}$ <br> $\begin{array}{lllllllllll}2 & 2 & 2 & 3 & 3 & 3 & \text { A A A } & 4 & 4 & 4\end{array}$ <br> $\begin{array}{llll}2 & 2 & 2 & \text { A A A } 4\end{array} 44$ <br> $\begin{array}{lllllllllllll} & & & 5 & 5 & 5 & 6 & 6 & 6 & Q & Q & Q \\ & & & 5 & 5 & 5 & 6 & 6 & 6 & Q & Q & Q \\ & & & 5 & 5 & 5 & 6 & 6 & 6 & Q & Q & Q \\ B & B & B & & & & 1 & 1 & 1 & \mathrm{X} & \mathrm{X} & \mathrm{X} \\ \mathrm{B} & \mathrm{B} & \mathrm{B} & \mathrm{X} & \mathrm{X} & \mathrm{X} & 1 & 1 & 1 & \mathrm{X} & \mathrm{X} & \mathrm{X} \\ \mathrm{B} & \mathrm{B} & \mathrm{B} & \mathrm{X} & \mathrm{X} & \mathrm{X} & \mathrm{X} & \mathrm{X} & \mathrm{X} & \mathrm{X} & \mathrm{X} & \mathrm{X}\end{array}$ | $\mathbf{B} 45$ Move $\mathrm{B}:$          <br> 2 2 2 3 3 3 A A A $\$$ $\$$ $\$$ <br> 2 2 2 3 3 3 A A A 4 4 4 <br> 2 2 2    A A A 4 4 4 <br>    5 5 5 6 6 6 Q Q Q <br> B B B 5 5 5 6 6 6 Q Q Q <br> B B B 5 5 5 6 6 6 Q Q Q <br> B B B    1 1 1 X X X <br>    X X X 1 1 1 X X X <br>    X X X X X X X X X |  | 147. Move $Q:$ <br> $\begin{array}{lllllllllll}2 & 2 & 2 & 3 & 3 & 3 & \text { A A A }\end{array}$ <br> $\begin{array}{lllllllllll}2 & 2 & 2 & 3 & 3 & 3 & \text { A A A } & 4 & 4 & 4\end{array}$ <br> $\begin{array}{llll}2 & 2 & 2 & \text { A A A } 4\end{array} 44$ <br> 555666 <br> B B B $5 \quad 5 \quad 5 \quad 6 \quad 6 \quad 6$ <br> B B B $5 \quad 5 \quad 5666$ <br>  <br> $\mathrm{X} \times \mathrm{X} \quad 1 \quad 1 \quad 1 \mathrm{X} \times \mathrm{X} \quad \mathrm{Q} \quad \mathrm{Q} \quad \mathrm{Q}$ <br> $\mathrm{X} \times \mathrm{X} \times \mathrm{X} \times \mathrm{XX} \mathrm{X} Q \mathrm{Q} 0$ |
|  | $\mathbf{1} 49$ Move 5 :        <br> 2 2 2 3 3 3 A A A $\$$ $\$$ <br> 2 2 2 3 3 3 A A A 4 4 <br> 4           <br> 2 2 2    A A A 4 4 <br> 4           <br> B B B    5 5 5 6 6 <br>  5 5 6 6 6      <br> B B B    5 5 5 6 6 <br> B B B 1 1 1 X X X Q Q <br> X Q          <br> X X X 1 1 1 X X X Q Q <br> X Q          <br> X X X X X X X X X Q Q |  |  |
| 7 52  Move 1 $;$       <br> 2 2 2 3 3 3 A A A $\$$ $\$$ $\$$ <br> 2 2 2 3 3 3 A A A 4 4 4 <br> 2 2 2    A A A 4 4 4 <br>       5 5 5 6 6 6 <br>       5 5 5 6 6 6 <br> 1 1 1 B B B 5 5 5 6 6 6 <br> 1 1 1 B B B X X X Q Q Q <br> X X X B B B X X X Q Q Q <br> X X X X X X X X X Q Q Q |  | \#54. Move 3: |  5 5 Move $\mathrm{A}:$       <br> 3 3 3       $\$$ $\$$ |
| $\$ 5$ 5 Move 4 $:$        <br> 3 3 3 4 4 4    $\$$ $\$$ $\$$ <br> 3 3 3 4 4 4       <br> 2 2 2 $A$ $A$ $A$       <br> 2 2 2 $A$ $A$ $A$ 5 5 5 6 6 6 <br> 2 2 2 $A$ $A$ $A$ 5 5 5 6 6 6 <br> 1 1 1 $B$ $B$ $B$ 5 5 5 6 6 6 <br> 1 1 1 $B$ $B$ $B$ $X$ $X$ $X$ $Q$ $Q$ $Q$ <br> $X$ $X$ $X$ $B$ $B$ $B$ $X$ $X$ $X$ $Q$ $Q$ $Q$ <br> $X$ $X$ $X$ $X$ $X$ $X$ $X$ $X$ $X$ $Q$ $Q$ $Q$ |  5 7 Move 5 $:$       <br> 3 3 3 4 4 4 5 5 5 $\$$ $\$$ $\$$ <br> 3 3 3 4 4 4 5 5 5    <br> 2 2 2 $A$ $A$ $A$ 5 5 5    <br> 2 2 2 $A$ $A$ $A$    6 6 6 <br> 2 2 2 $A$ $A$ $A$    6 6 6 <br> 1 1 1 $B$ $B$ $B$    6 6 6 <br> 1 1 1 $B$ $B$ $B$ $X$ $X$ $X$ $Q$ $Q$ $Q$ <br> $X$ $X$ $X$ $B$ $B$ $B$ $X$ $X$ $X$ $Q$ $Q$ $Q$ <br> $X$ $X$ $X$ $X$ $X$ $X$ $X$ $X$ $X$ $Q$ $Q$ $Q$ |  |  |

