## Climb 15



Designed and made by Minoru Abe, circa 1985. (cardboard box $7+7 / 8^{\prime \prime} \times 5.5 " \times 3 / 4 "$ with wood tray and 15 wood pieces, $7+7 / 16^{\prime \prime}$ x $5+1 / 8^{\prime \prime}$ x 9/16")
The puzzle has these pieces (a second red T-piece is a keeper piece to be removed):


The directions give four starting positions for the problem of moving the red T-piece to the top:


Problem 1


Problem 2


Problem 3


Problem 4

These four problems do not place any constraints on the other pieces of a final position. Here we also consider what we refer to as Problem 2A, which amounts to moving up the T-piece together with the two squares next to it and dropping down the remainder of the starting position:


Problem 2A

## Climb 15 Solution Problem 1

Here is every other step of a solution of 104 rectilinear moves for Climb 15 problem 1:

| 0: | move 2: | move 4: | move 6: | move 8: | move 10: | move 12: | move 14: |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| \$ \$ \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ |
| 12 | 2 | A A 2 | A A 2 XY | A A 2 X | $\begin{array}{llll}\text { A } & \mathrm{A} & 2 & \mathrm{X}\end{array}$ | A A 2 X | A A 2 X |
| A A B X Y | A A B X Y | A B B Y | A B $\quad \mathrm{X}$ Y | A B X | A B D D X | A B D D X | A B D D X |
| A B B X Y | A B B X Y | B B X Y | B B | B B D D Y | $\mathrm{B} \mathrm{B} \quad \mathrm{D} Y$ | B B C D Y | B B C D |
| O O C D D | $\bigcirc 0 \mathrm{CD}$ D |  | O O C D D | O OCD Y | $\bigcirc \mathrm{O}$ C Y | $\bigcirc 0 \mathrm{CCH}$ | $\bigcirc$ O C C |
| O O C C D | 0 O C C D | $\bigcirc \bigcirc \mathrm{CCD}$ | $\bigcirc \bigcirc O C D$ | 0 O C C | O O C C | 0 ONH | $\bigcirc \mathrm{ONN}$ |
| M M T N N | M M T N N | M M T N N | M M T N | M M T N N | M M T N N | M M T | M M T 4 X |
| 3 T ${ }^{3}$ T 4 | T T T 74 | T T T 4 | 3 T T T 4 | T T T 4 | 3 T T T 4 | 3 T 3 T T 4 | 3 T T T X |
| move 16: | move 18: | move 20: | move 22: | move 24: | move 26: | move 28: | move 30: |
| \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ |
| A A 2 D D | A A D D | A $\boldsymbol{A}$ B $\quad \mathrm{D} D$ | $\boldsymbol{A} A$ | A A B D D | A A D D | A A D D | $\mathrm{A} A \mathrm{D} D \mathrm{X}$ |
| $\mathrm{A} B \quad \mathrm{D}$ |  |  | A $\quad \mathrm{B}$ B C D | A B B C D | $\begin{array}{llllll}\text { A } & \mathrm{B} & \mathrm{C} & \mathrm{D}\end{array}$ | $\begin{array}{lllll}\text { A } & \mathrm{B} & C & D\end{array}$ | A B C D X |
| B B C | B B C C | 2 Cc | 0 O 2 C C | 2 Cc | B B C C | B B C C | B B C C Y |
| O O C C X | 0 O 2 X | 0 0 X | $\bigcirc \mathrm{O} N \mathrm{NX}$ | N NX | 2 N N X | 2 N N X | 2 NW Y |
| O O N N X | 0 O N N X | $\bigcirc \mathrm{O} N \mathrm{NX}$ | X | O OMM X | O OMM X | O o M M X | $\bigcirc$ OMM |
| M M T 4 Y | M M T 4 Y | M M T 4 Y | M M T 4 Y | 0 OT 4 Y | 0 OT 4 Y | 0 O T 4 | $\bigcirc \bigcirc 14$ |
| 3 T T T Y | T T T Y | 3 T T T Y | 3 T T T X | 3 T T T Y | 3 T T T Y | 3 T T T Y | 3 T T T |
| move 32: | move 34: | move 36: | move 38: | move 40: | move 42: | move 44: | move 46: |
| \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ |
| A A D D X | A A D D X | A A D D X | A A D D X | A A D D X | A A D D X | A A D D X | A A D D X |
| A B C D X | A B C D X | A B C C D X | A B C D D | A B C D X | A B C D X | A B C D X | A B C D X |
| B B C C Y | B B C C Y | B B C C Y | B B C C Y | B B C C Y | B B C CY | B B C C Y | B B C C Y |
| 2 NNX | 2 N N X | N NX | $\mathrm{NH} \quad \mathrm{Y}$ | N NMMMY | N N M M Y | N NMMMX | M M X |
| O o M M | 0 or M M | $\bigcirc$ O M M | $\bigcirc \mathrm{O}$ M M | 004 | 0 O 4 T | 4 T | N N 4 T |
| 0 O T 4 | 0 O T 4 | O O T 4 | $\bigcirc 0$ | 0 O T | O O T T T | O O T T T | O O T T T |
| 3 T T T | 3 T T T | 23 T T T | 23 T T T | 23 T T T | 23 | 0 O2 3 | 0023 |
| move 48: | move 50: | move 52: | move 54: | move 56: | move 58: | move 60: | move 62: |
| \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ |
| A A D D X | A A D D X | A A D D X | A A D D X | A A D D X | A A D D | A A C D D | A A C D D |
| A B C D X | A B C D X | A B C D X | A B C D X | A B C D X | A B C D | A B C C D | A B C C D |
| B B C C Y | B B C C Y | B B C C X | B B C C X | B B C C Y | B B C C X | B B $\quad$ X | B B 23 X |
| M M 4 T Y | M M 4 T Y | $4 \mathrm{~T} Y$ | 4 T Y | 4 T 23 Y | 4 T 23 X | 4 T 23 X | 4 T X |
| N N T T T | N N T T T | T T T | T T T | T T T | T T T | T T T | T T T |
| $\bigcirc$ | O 02 |  | M M O O 2 | M M O O | M M O O Y | M M O O Y | M M o o x |
| $\begin{array}{llll}0 & 0 & 2\end{array}$ | 003 | NO 03 | N N O O 3 | N N O O | N NOOO | N NOOO | N N O |
| move 64: | move 66: | move 68: | move 70: | move 72: | move 74: | move 76: | move 78: |
| \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ $1 . \$$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ |
| A A C D D | C D D | C D D | C D D X 3 | C D D X 3 | C D D X 3 | C D D X 3 | C D D X 3 |
| A B C C D | C C D | C C D | C C D X | C C D X 2 | C C D X 2 | C C D X 2 | C C D X 2 |
| B B 23 X | A A 23 X | A A 23 X | A A 2 | A A 4 | A A T $\mathrm{T}^{4}$ | A A T 4 | T 4 |
| $4 \mathrm{~T} X$ | A B 4 T X | A B 4 T X | A B 4 T | A B T | A B T T T | A B T T T | A A T T T |
| T T T | B B T T T | B B T T T | B B T T T | B B T T T | B B O O | B B O O | A B O O |
| M M O O Y | M M O O Y | M M O O Y | M M O O Y | M M O O Y | M M O O Y | O O Y | B B O O Y |
| $\mathrm{N} N \mathrm{O}$ | N NOOX | N NOOX | N NOOO O | N N 0 O Y | $\mathrm{N} \mathrm{N} \quad \mathrm{Y}$ | M M N N X | M M N N X |
| move 80: | move 82: | move 84: | move 86: | move 88: | move 90: | move 92: | move 94: |
| \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ |
| D D X 3 | D D X 23 | D $\mathrm{D} X 23$ | D D X 23 | D D X 23 | D D X 23 | D D X 23 | $\mathrm{X} \quad 23$ |
| C D X 2 | C D X | C D X T 4 | C D X T 4 | C D X T 4 | C D X T 4 | D X T 4 | X T 4 |
| C C T 4 | C C T 4 | C CTT T | C C T T T | C C T T T | C C T T T | T T T | D D T T |
| A A T T T | A A T T T | A A | A A B O O | A A B O O | A A $\quad \mathrm{B}$ | C A A B | C D A A B |
| A B O 0 | A B O O | A B O O | A B B O O | A B B O O | A $\quad \mathrm{B}$ B | C C A B B | C C A B B |
| B B O O Y | B B O O Y | B B O O $\quad$ Y | Y | N N Y | N N Y O O | N N Y O O | N N Y O o |
| MMNNX | M M N Y | M M N NX | M M N N Y | M M Y | M M Y O O | M M Y O O | M M Y O O |
| move 96: | move 98: | move 100: | move 102: | move 104: |  |  |  |
| \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ T \$ \$ |  |  |  |
| X 2 | $\begin{array}{lllll}\mathrm{X} & 2 & \mathrm{~T} & 4\end{array}$ | $\begin{array}{llll}X & 2 & T & 4\end{array}$ | X T 4 | X T T T T 4 |  |  |  |
| $\begin{array}{lllll}\mathrm{X} & 3 & \text { T } 4\end{array}$ | X 3 T T T | X 3 T T T | X T T T | X |  |  |  |
| D D T T T | D D | A A | $3 \quad 2 \mathrm{Al}$ | $\begin{array}{lllll}3 & 1 & 2 & \text { A A }\end{array}$ |  |  |  |
| C D A A B | C D A A B | C D D A B | C D D A B | C D D A B |  |  |  |
| C CABB | C CAB B | $C \quad C \quad D B B$ | C C D B B | C C D B B |  |  |  |
| N N Y O O | N N Y O O | N N Y O | N N Y O | N N Y O |  |  |  |
| M M Y O O | M M X O O | M M X O O | M M M O O | M M X O O |  |  |  |

## Climb 15 Solution Problem 2

Here is every third step of a solution of 132 rectilinear moves for Climb 15 problem 2:

| 0: | move 3: | move 6: | move 9: | move 12: | move 15: | move 18: | move 21: |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| \$ \$ \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ |
| $1 \quad 2$ | 1 X 00 | 100 | M M O O | M M Y O O | M M Y O O | M M 1 0 o | M M 1 0 o |
| M M X ooo | M M X ooo | M M X o o | X 1100 | X 1 Y 00 | 1 Y O O | 00 | D C C O O |
| N N X O O | N N | X N N | X N N | XCCNN | C CNN | $\mathrm{C} C \mathrm{~N} \mathrm{~N}$ | D D CNN |
| C C Y A A | C CYA A | C C Y A A | C C Y A A | D CAA | D C A A | D C Y A A | A A |
| D C Y A B | D C Y A B | D C Y A B | D C C A B | D D A B | D D A B | D D Y A B | Y A B |
| D D T B B | D D T B B | D D T B B | D D T B B | T B B | X 3 T B B | X 3 T B B | X 3 T B B |
| 3 T T T 4 | 3 T T T 4 | 3 T T T 4 | 3 T T T 4 | 3 T T T 4 | X T T T | X T T T 4 | X $\mathrm{T}^{\text {T }}$ T 4 |
| move 24: | move 27: | move 30: | move 33: | move 36: | move 39: | move 42: | move 45: |
| \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ | \$ \$ 2 \$ | \$ \$ 2 \$ \$ |
| M M 1 0 o | M M 1000 | M M 1 o o | M M 100 | M M 1 0 0 | M M 1 o o | M M oo | M M Y O O |
| D C C O O | D C C O O | D C C O O | D C C oo | D C C O O | D C C O O | 100 | Y 00 |
| D D CNN | D D CN N | D D C N N | D D C 3 | D D C 3 B | D D C 3 B | C C 3 B | 13 B |
| Y A A B | Y A A B | Y A A | Y N N | Y N N B B | Y B B | D C Y B B | D C C B B |
| $\mathrm{Y} \mathrm{A} \quad \mathrm{B} B$ | Y A 3 B B | $\mathrm{Y} \mathrm{A} \quad 3 \mathrm{~B}$ | $\mathrm{Y} \mathrm{A} \mathrm{A} \quad \mathrm{B}$ | Y A A | Y NH | D D Y N N | D D CNN |
| X 3 T 4 | X T 4 | X T B B | $X \mathrm{~A}$ T B B | X A T 4 | X A A T | XA AT | X A A T 4 |
| X T T T | X T T T | X T T T 4 | X T T T 4 | X T T T | X ATTT | X ATTT | X A T T T |
| move 48: | move 51: | move 54: | move 57: | move 60: | move 63: | move 66: | move 69: |
| \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ $2 \mathrm{\$}$ \$ | \$ \$ 2 \$ | \$ \$ 2 \$ | \$ \$ 2 \$ \$ |
| Y 0 O | Y O O ( 3 B | Y O 0.3 B | Y O O 3 B | Y 003 B | Y 003 B | Y O 0.3 B | y O 0.3 B |
| Y 00 | Y O O B B | Y O O B B | Y O O B B | Y O O B B | Y O O B B | Y O O B B | Y 0 O $\quad$ B B |
| M M 1 3 B | M M 1 N N | 1 NN | $\mathrm{N} \mathrm{N} \quad \mathrm{C} C$ | N N D C C | N N D C C | N N 1 C C | N N 1 C C |
| D C C B B | D C C | D C C | 1 D C | X 1 DDC | X 1 D D C | X D C | A A X D C |
| D D CNN | D D C | M M D D C | M M D D | $\mathrm{X} \quad \mathrm{MM}$ | $\mathrm{X} \quad \mathrm{MM}$ | $\mathrm{X} \quad \mathrm{D}$ D | A T X D D |
| XA A T 4 | XA A T 4 | X A A T 4 | X A A T 4 | A A T 4 | $\boldsymbol{A} \boldsymbol{A}$ T | A A T M M | T T T M M |
| X A T T T | XAT T T | X ATTT | X ATTT | A T T T | ATTT | ATTT | 4 |
| move 72: | move 75: | move 78: | move 81: | move 84: | move 87: | move 90: | move 93: |
| \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ | \$ \$ 2 \$ | \$ \$ 2 \$ | \$ \$ 2 \$ \$ |
| X 003 B | X 00 | N N Y O | N N Y O | N N Y O 0 | N N Y O O | N N Y O | N N Y O O |
| Y 00 B B | x 00 | Y 00 | A A Y O O | A A Y O O | A A Y O O | A A Y oo | A A Y O O |
| N N 1 C C | $\mathrm{N} \mathrm{N} 1 \mathrm{l}^{3} \mathrm{3} \mathrm{B}$ | 13 B | A $1 \times 3 \mathrm{~B}$ | A $1 \times 3 \mathrm{~B}$ | A 1 X | A T $1 \times 3$ | A T $1 \times 3$ |
| A A X C | A $\mathrm{A} \times \mathrm{X}$ B B | A $\mathrm{A} \times \mathrm{X}$ B |  | T X B B | T X | T T TXB | T T T X B |
| A T X | A T X C C | A T X C C | T C C | T T T C C | T T T B B | B B | 4 MMBB |
| T T T D | T T T D C | T T T D C | T T T D C | M M D C | M M D C C | M M D C C | D C C |
| 4 MMDDD | 4 MMDD | 4 MMDD | 4 MM D D | D D | 4 D D C | D D C | D D C |
| move 96: | move 99: | move 102: | move 105: | move 108: | move 111: | move 114: | move 117: |
| \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ |
| N N Y O O | $\mathrm{NN} \quad \mathrm{Y}$ | A A N N Y | A ANNY | $\mathrm{A} A \mathrm{NWX}$ | A A N N Y | A A N N | A A N N |
| A A X O 0 | A A Y | A 1 X | A $\mathrm{T} \quad 1 \mathrm{Y}$ | A T 1 | A T 1 Y | A T 1 | A 4 T |
| A T 1 X | A T 11000 | T 00 | T T T O O | T T T O O | 4 T T T | 4 T T T | T T T |
| T T T X | T T T O O | T T TOO | 4 MM 0 O | 4 MM 0 O | M M o o | M M O O Y | M M O O Y |
| 4 MM 3 | 4 MMXX 3 | 4 MMX 3 | X 3 | C C | C C O O | C Coo Y | C C O O Y |
| D C C B | D C C X B | D C C X B | D C C C X B | D C X 3 B | D C X 3 B | D CX 3 B | D C X 3 B |
| D D C B B | D D C B B | D D C B B | D D C B B | D D X B B | X | D XB | D $\mathrm{D} \times \mathrm{X}$ |
| move 120: | move 123: | move 126: | move 129: | move 132: |  |  |  |
| \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ T \$ \$ |  |  |  |
| $\begin{array}{lllll}\mathrm{N} & \mathrm{N} & 4 & 1\end{array}$ | N N 4.4 | $\begin{array}{llllll}\mathrm{N} & \mathrm{N} & 4 & \mathrm{~T} & 1\end{array}$ | $\begin{array}{llll}4 & \text { T } & 1\end{array}$ | 4 T T T 1 |  |  |  |
| A A T | A A T T T | A A T T T | T T T | 2 |  |  |  |
| A T T T | A 0 O Y | A 000 Y | N NOOM | N NOO O |  |  |  |
| M M O O Y | M M O O Y | M M O O X | A A O O X | A A O O Y |  |  |  |
| C C O O Y | C C | X 3 | A M M X 3 | A M M X 3 |  |  |  |
| D C X 3 B | D C X 3 B | D C C X B | D C C X B | D C C X B |  |  |  |
| D D X B B | D $\mathrm{D} \times \mathrm{X}$ B | D D C B B | D D C B B | D D C B B |  |  |  |

## Climb 15 Solution Problem 2A

Here is every third step of a solution of 173 rectilinear moves for Climb 15 problem 2A:

| 0; | move 3: | move 6: | move 9: | move 12: | move 15: | move 18: | move 21: |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| \$ \$ \$ \$ | \$ \$ X \$ \$ | \$ \$ x \$ \$ | \$ \$ X \$ \$ | \$ \$ x \$ \$ | \$ \$ X \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ |
| $1 \quad 2$ | 12 X | 12 X 00 | 12 x 00 | 12 X 00 | $12 \times 00$ | 1 X 00 | $\mathrm{X} \quad 00$ |
| M M X ooo | M M Y oo | M M Y oo | M M Y O O | M M Y oo | M M oor | M M X o o | $\mathrm{x} \quad 00$ |
| N N X O | N N Y O O | $\mathrm{N} \mathrm{N} Y \mathrm{Y} \mathrm{A}$ | N N Y A A | N NYA A | A A | A A | 1 MMAA |
| C C Y A A | C C A A | C C A | C CAB | 3 CCAB | $3 \mathrm{~N} N \mathrm{AB}$ | 3 NNAB | 3 NNAB |
| D C Y A B | D C A B | D C B | D $\quad \mathrm{C} B \mathrm{~B}$ | C B B | C C Y B B | C C Y B B | C C Y B B |
| D D $\quad$ T B B | D D T B B | D D T B B | D D $\quad$ T 4 | D $\quad$ T 4 | D C Y T 4 | D C Y Y T 4 | D C Y T 4 |
| 3 T T T 4 | T T T 4 | 3 T T T 4 | 3 T T T | D D T T T | D D T T | D D T T T | D D T T T |
| move 24: | move 27: | move 30: | move 33: | move 36: | move 39: | move 42: | move 45: |
| \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ |
| X 0 O A A | X 00 A A | X 00 A A | X 00 A A | $\mathrm{X} 00 \mathrm{~A} \boldsymbol{A}$ | x 0 o A A | $\mathrm{X} 00 \mathrm{~A} \boldsymbol{A}$ | x 00 A A |
| X O O A B | X 00 A A | X 000 A B | X O 0 A B | X 0 O A B | X O O A B | X 00 A B | X 00 AB |
| M M B B | 1 M M B B | 1 MMBBB | 1 M M B B | 1 MM B B | 1 MM B B | 1 MMBB | M M B B |
| 3 N N | C C 3 | C C X 3 | $\begin{array}{llll}\text { C C } & \mathrm{Y} & 3\end{array}$ | D C C Y 3 | D C C C X 3 | D C C | D C C |
| C C Y | C Y N N | D C Y N N | D C Y | D D C Y | D D C Y 4 | D D C Y | D D C Y |
| D C Y T 4 | D $\begin{array}{lllll}\text { Y } & \text { T } & 4\end{array}$ | D D T 4 | D D T N N | T N N | T | T 43 Y |  |
| D D T T T | D D T T T | T T T | T T T 4 | T T T 4 | T T T N N | T T T N N | T T T N N |
| move 48: | move 51: | move 54: | move 57: | move 60: | move 63: | move 66: | move 69: |
| \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ |
| 0 O A A | 0 O A A B | O O A A B | 0 O A A | 0 O A A Y | M M O O X | M M O O Y | M M 300 |
| 0 O A B | O O A B B | $\bigcirc O^{\circ} \mathrm{A}$ B B | $\bigcirc 0$ A B | 0 O A Y | 0 O Y | 300 Y | 00 |
| M M B B | $\mathrm{MM} \quad \mathrm{C}$ C | M M D C C | M M B B | M M B | A A B | A A B | A A B Y |
| X D C C | X D C | X 3 D D C | X 3 C C | X $3 \quad \mathrm{~B}$ B | X 3 A B B | $X$ A B B | $X A B E X$ |
| X D D C Y | X D D P | X 4 Y | X 4 D C Y | X 4 D C C | X 4 D C C | X 4 D C C | X 4 D C C |
| 1 T 43 Y | 1 T | 1 T | 1 T D D Y | 1 T D D C | 1 T D D C | 1 T D D C | 1 T D D C |
| T T T N N | T T T N N | T T T N N | T T T N N | T T T N N | T T T N N | T T T N N | T T T N N |
| move 72: | move 75: | move 78: | move 81: | move 84: | move 87: | move 90: | move 93: |
| \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ |
| M M 00 | MMOO O | M M O O Y | $\mathrm{MM} \circ \mathrm{O} \mathrm{Y}$ | M M O O Y | M M O O X | M M O O Y | M M O O |
| A A 00 | A A O O Y | A A O O Y | A A OOX | A A O O Y | A A O O X | A A O O Y | A A O O |
| A $3 \mathrm{~B} \quad \mathrm{Y}$ | A 3 B C C | A 3 BCC | A 3 B C C | A $3 \mathrm{~B} C \mathrm{C}$ | A 3 B C C | A $3 \quad \mathrm{~B}$ | A 3 B Y |
| $\begin{array}{llllll}\mathrm{X} & \mathrm{B} & \mathrm{B} & \mathrm{Y}\end{array}$ | X B B C | $X B B D C$ |  | $X \quad \mathrm{~B}$ B D C | X B B $\quad \mathrm{D} C$ | X B B | $\mathrm{X} 1 \mathrm{I}^{\text {B }} \mathrm{B} \mathrm{Y}$ |
| X 4 D C C | X 4 D | X 4 DD | X 14 L D D | $\mathrm{X} \quad 1 \mathrm{D}$ D | X T 1 D D | $\begin{array}{lllllll}\mathrm{X} & \mathrm{T} & 1 & \mathrm{C} & \mathrm{C}\end{array}$ | X T C C |
| 1 T D D C | 1 T D D | $1 \mathrm{~T} \mathrm{~N} \mathrm{~N}^{\text {c }}$ | T N N | 4 | T T T | T T T D C | T T T D C |
| T T T N N | T T T N N | T T | T T | T T T | N N | N N 4 D D | N N 4 D D |
| move 96: | move 99: | move 102: | move 105: | move 108: | move 111: | move 114: | move 117: |
| \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ |
| M M 300 | M M 300 | M M O O Y | M M O O Y | M M O O Y | Mm O O Y | MMOO O | M M O O Y |
| A A O O | $\mathrm{X} \quad 00$ | X 300 O | X 300 x | X 300 Y | X 300 y | X 300 O | X 300 Y |
| A B Y | X A A B Y | $X$ A A B | X 1 A A A B | $\mathrm{X} 1 \mathrm{I}^{\text {A A A B }}$ | X 1 | X T 1 A A | X T 1 A A |
| X 1 B B Y | 1 ABBBY | 1 A B B | А B B | т $\boldsymbol{\text { A B B }}$ | T A B | T T TAB | T T TAB |
| X T C C | T C C | T C C | T C C | T T T C C | T T TBB | 4 B B | N N 4 B B |
| T T T D C | T T T D C | T T T D C | T T T D C | 4 D C | 4 D C C | D C C | D C C |
| N N 4 D D | N N 4 D D | N N 4 D D | N N 4 D D | N N D D | N N D D C | N N D D C | D D C |
| move 120: | move 123: | move 126: | move 129: | move 132: | move 135: | move 138: | move 141: |
| \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ |
| M M O O | M M 1 0 o | M M 1 0 o | M M 1 0 o | M M 1 O o | M M 1 0 o | M M | 31 MM |
| X 300 | $\times 3$ T O O | X 3 T O O | X 3 T O O | X 3 T O O | 3 T O O | 3 T 100 | T 00 |
| $\begin{array}{lllll}\mathrm{X} & \mathrm{T} & 1 & \mathrm{Y}\end{array}$ | X T T TY | X T T T Y | X T T T | X T T T | T T T | T T T 00 | T T T 00 |
| T T T Y | Y | N N 4 Y | N N 4 | N NA A | $\mathrm{X} \mathrm{N} \mathrm{NA} A$ | X N N A A | X N N A A |
| N N 4 A A | N N 4 A A | C C A A | C CAA | C C A 4 | X C C A 4 | X C C A 4 | X C CA 4 |
| D C C A B | D C C A B | D C A B | D C A B Y | D C B Y | D $\quad \mathrm{C}$ B Y | D C B Y | D CB B |
| D D C B B | D D C $\quad \mathrm{B}$ B | D D B B | D D B B X | D D B B Y | D D B B X | D D B B Y | D D B B Y |
| move 144: | move 147: | move 150: | move 153: | move 156: | move 159: | move 162: | move 165: |
| \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ 2 \$ \$ | \$ \$ T \$ \$ | \$ \$ T \$ \$ | \$ \$ T \$ \$ | \$ \$ T \$ \$ |
| 3 T 1 MM | 3 T 1 MM | 3 T 1 MM | 3 T 1 | 3 T T T 1 | 3 T T T 1 | 3 T T T 1 | 3 T T T 1 |
| T T TOO | T T T O O | T T TOO | T T T | 2 | 4 N N 2 | $\mathrm{N} N \mathrm{MM} 2$ | N N M M 2 |
| X N N O O | X N NO O | X N N O O | X N N M M | X N N M M | X M M | 4 X | 4 XY 0 O |
| X A A | X 4 | X 4 Y | $X 4 Y 00$ | $X 4 \mathrm{Y} \times 0$ | X X O o | X X 0 O | X Y 00 |
| C C A 4 | C C A A | C C $\quad \mathrm{Y}$ | C C Y O O | C C Y O O | C C X oo | C C X O O | C C A A |
| D C B X | D C A B Y | D C A A B | D C A A B | D C A A B | D C A A B | D C A A B | D C A B |
| D D B B X | D D B B Y | D D A B B | D D A B B | D DABB | D D A B B | D D A B B | D D B B |
| move 168: |  | move 173: |  |  |  |  |  |
| \$ \$ T \$ \$ | $\$ \$ T \$ \$$ | $\$ \$ T \$ \$$ |  |  |  |  |  |
| 3 T T T 1 | 3 T T T | T T T |  |  |  |  |  |
| N N M M 2 | 2 | 321 |  |  |  |  |  |
| 400 | M M 4000 | M M 4 O O |  |  |  |  |  |
| X 00 | $\mathrm{N} \mathrm{N} X \mathrm{O}$ | $\mathrm{N} \mathrm{N} X \mathrm{O}$ |  |  |  |  |  |
| C C X A A | C C X A A | C C X A A |  |  |  |  |  |
| D C Y A B | D C C Y A B | D C C Y A B |  |  |  |  |  |
| D D Y B B | D D Y B B | D D Y B B |  |  |  |  |  |

## Climb 15 Solution Problem 3

Here is every other step of a solution of 101 rectilinear moves for Climb 15 problem 3:

| 0: | move 2: | move 4: | move 6: | move 8: | move 10: | move 12: | move 14: |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| \$ \$ \$ \$ | \$ \$ \$ \$ | \$ \$ x \$ \$ | \$ \$ x \$ \$ | \$ \$ X \$ \$ | \$ \$ x \$ \$ | \$ \$ \$ \$ | \$ \$ 1 \$ \$ |
| $1 \quad 2$ | $\begin{array}{lll}1 & 2 & 4\end{array}$ | $12 \times 4 \mathrm{~B}$ | $12 \times 4 \mathrm{~B}$ | $12 \times 4 \mathrm{~B}$ | $12 \times 4 \mathrm{~B}$ | $1 \quad 4 \mathrm{~B}$ | $\bigcirc 0.48$ |
| C $3 \times 4 \mathrm{~B}$ | C 3 X B | C $3 \quad \mathrm{~B}$ B | C B B | $\bigcirc \mathrm{OCBB}$ | O O B B | 002 BB | 0 O 2 BB |
| C C X B B | C C X B B | C C | C C 3 | $\bigcirc 0 \mathrm{CCH}$ | $\begin{array}{llll}0 & 0 & \text { C }\end{array}$ | O o x c 3 | X C 3 |
| O O Y M M | O O Y M M | O O Y M M | O O Y M M | $\mathrm{Y} \quad \mathrm{M} \mathrm{M}$ | Y C C | $\mathrm{Y} \quad \mathrm{x}$ c c | Y $\quad \mathrm{Ccc}$ |
| O O Y N | OOY N N | O O Y N | O O Y N N | Y N N | Y MMNN | Y M M N N | Y M M N |
| A A T D D | A A T D D | A A T D D | A A T D D | A A T D D | A A T D D | A A T D D | A A T D D |
| ATTTD | A T T T D | A T T T D | A T T T D | A T T D | A T T T D | A T T T D | ATTT D |
| move 16: | move 18: | move 20: | move 22: | move 24: | move 26: | move 28: | move 30: |
| \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ |
| 0 O 0 ¢ B | 0048 | 0 O X 4 B |  | 0 O X 4 B | $00 \times 4 \mathrm{~B}$ | O $0 \times 4 \mathrm{~B}$ | 0 O X 4 B |
| 0 O 2 B B | $\bigcirc 0$ B B | O 0 XBB | O 0 XBB | $\bigcirc 0 \mathrm{XBB}$ | O O X B B | O 0 X B B | O O X B B |
| $\begin{array}{lllll}\mathrm{y} & \mathrm{X} & \mathrm{C} & 3\end{array}$ | $\begin{array}{lllll}\mathrm{Y} & \mathrm{X} & \mathrm{C} & 3\end{array}$ | $\mathrm{Y} \mathrm{C} \quad 3$ | Y C 3 NN | $\mathrm{Y} C 3 \mathrm{NN}$ | $\mathrm{x} C 3 \mathrm{NN}$ | Y C 3 NN | Y C 3 NN |
| $\mathrm{x} \mathrm{X} \quad \mathrm{C}$ C | $\begin{array}{llll}\mathrm{Y} & \mathrm{X} & \mathrm{C} & \mathrm{C}\end{array}$ | X C C | $\mathrm{X} C \mathrm{C}$ | Y C C D D | Y C C D D | Y C C D D D | Y C C D D |
| M M N N | MM 2 NW | M M 2 NN | M M 2 | M M D | A A M M D | A A D | D |
| A A T D D | A A T D D | A A T D D | A A T D D | $\mathrm{A} \boldsymbol{A}$ T | A T | A T M M | A A T M M |
| ATTTD | A T T T D | A T T T D | A T T T D | A T T 2 | T T T 2 | T T T 2 | ATTT2 |
| move 32: | move 34: | move 36: | move 38: | move 40: | move 42: | move 44: | move 46: |
| \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ |
| 0 O X 4 B | $0 \mathrm{O} \times 4 \mathrm{~B}$ | 0 O X 4 B | 0 O 4 B | 0 O X 4 B | $00 \times 4 \mathrm{~B}$ | 0 O ${ }^{4} 4 \mathrm{~B}$ | 0 O X |
| 0 O X B B | O $0 \times \mathrm{B}$ B | 0 O X B B | O O X B B | $\bigcirc 0 \times \mathrm{B}$ - | O O X B B | O O X B B | 0 O X |
| $\mathrm{Y} \quad \mathrm{N} \mathrm{N}$ | N N | N N 3 D D | N N 3 D D | N N 3 D D | N N 3 D D | N N 3 | N N 348 B |
| X C 3 D D | Y C 3 D D | Y C D | Y C D | A A Y C D | A A Y C D | A A Y | A A X B B |
| C C D | Y C C C D | Y C C | Y c C | A T Y C C | A T Y C C | A T Y D D | A T X D D |
| A A T M M | A A T M M | A A T M M | A A T M M | T T T M M | T T T | T T T C D | T T T C D |
| ATTT 2 | A T T T 2 | ATTT2 | A T T T 2 | 2 | 2 MM | 2 MMCC | 2 MMCC |
| move 48: | move 50: | move 52: | move 54: | move 56: | move 58: | move 60: | move 62: |
| \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ |
| 0 O X | N NOOX | N NOOC | N NOOOX | N NOOOX | N NOOOX | N NOOOX | N NOOC |
| 0 O X | A A O O X | A A 000 X | A A O O X | A A O O X | A A 00 X | A A O O X | A A O O X |
| N N 34 B | A 34 B | A 3 Y 4 B | A 3 Y 4 B | A 3 Y 4 B | A 3 Y 4 | A 3 Y 4 | A T 3 Y 4 |
| A A Y Y B B | Y B B | Y B B | T Y B B | T Y B B | T Y B | T Y B | T T T Y B |
| A T Y D D | T Y D D | T D D | T T T D D | T T T D D | TTTEB | T T T B B | B B |
| T T T C D | T T T C D | T T T C D | $2 \mathrm{C} D$ | 2 C D | $2 \mathrm{C} D \mathrm{D}$ | $2 \mathrm{C} D \mathrm{D}$ | $2 \mathrm{C} D \mathrm{D}$ |
| 2 MMCC | 2 MMCC | 2 MMCC | M M C C | M M C C | M M C C D | M M C C D | M M C C D |
| move 64: | move 66: | move 68: | move 70: | move 72: | move 74: | move 76: | move 78: |
| \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ |
| N N O O X | N NOOX | N NOOOX | N NOOOX | N N N | N N 300 | N N 3 | A A N N 3 |
| A A O O X | A A O O X | A A O O X | A A O O X | A A 00 | A A 400 | A A 400 | A 400 |
| A T ¢ 3 Y 4 | A T 3 Y 4 | A T 3 3 Y 4 | A T 3 3 | A T 34 | A $T$ | A T 00 | T 00 |
| T T T $\mathrm{T}^{\text {P }}$ B | T T T Y B | T T T Y | T T T Y | T T T Y X | T T T Y X | T T T Y X | T T T Y X |
| M M 2.8 B | M M 2 B B | M M | M M Y | M M Y X | M M Y X | M M Y X | M M Y X |
| C D D | C D D | C D D 2 B | C D D 2 B | C D D 2 B | C D D 2 B | C D D 2 B | C D D 2 B |
| C C D | C C D | C C D B B | C C D B B | C C D B B | C C D B B | C C D B B | C C D B B |
| move 80: | move 82: | move 84: | move 86: | move 88: | move 90: | move 92: | move 94: |
| \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ |
| A A N N 3 | A A N N 3 | A A N N 3 | A A N N 3 | $\mathrm{N} \mathrm{N} \quad 3$ | N N 4 T 3 | N N 4 T 3 | N N 4 T 3 |
| A T 400 | A T 400 | A T 4 | A T ${ }^{4}$ | A A T | A A T T T | A A T T T | A A T T T |
| T T T O O | T T T 000 | T T T | T T T | ATTT | A | A X 000 | A X |
| M M Y X | M M X | M M X o o | M M X ooo | M M X ooo | M M X oo | M M X o o | M M X o o |
| Y X | D D $\quad$ X | D D X O O | D D X O O | D D X O O | D D X O O | D D | D D $\quad$ Y 2 |
| C D D 2 B | C D Y 2 B | C D Y 2.8 | C D Y 2 B | C D Y 2 B | C D Y 2 B | C D Y 2.8 | C D Y B |
| C C D B B | C C Y B B | C C Y B B | C C Y B B | C CYB B | C CYB B | C C Y B B | C C B B |
| move 96: | move 98: | move 100: | move 101: |  |  |  |  |
| \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ \$ \$ | \$ \$ T \$ \$ |  |  |  |  |
| N N 4 T 3 | 4 T 3 | 4 T 4 | 4 T T T 3 |  |  |  |  |
| A A T T T | T T T | $1 \mathrm{~T}^{1} \mathrm{~T}$ T | 1 |  |  |  |  |
| A $\begin{array}{llll} \\ & X & 0 & 0\end{array}$ | N N X $\quad 00$ | N N X X O 0 | N N X $\quad 000$ |  |  |  |  |
| $\begin{array}{ll}\mathrm{x} & 0 \\ 0\end{array}$ | A A X 0 O | A A X X O 0 | A A X $\quad 00$ |  |  |  |  |
| $\begin{array}{cc}\mathrm{M} & \mathrm{Y} \\ \mathrm{M} \\ \text { 2 }\end{array}$ | A M M Y 2 | A M M Y 2 | A M M Y 2 |  |  |  |  |
| C D D Y B | C D D Y B | C D D Y B | C D D Y B |  |  |  |  |
| C C D B B | C C D B B | $C \mathrm{CDBB}$ | $C$ C D B B |  |  |  |  |

## Climb 15 Solution Problem 4

Here is every third step of a solution of 148 rectilinear moves for Climb 15 problem 4:

| 0: | move 3: | move 6: | move 9: | move 12: | move 15: | move 18: | move 21: |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| \$ \$ \$ \$ | \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ x \$ \$ | \$ \$ X \$ \$ |
| 1 2 | 12 XNN | X N N | A A X N N | A A X N N | A A X N N | A A X N N | A A X N N |
| M M X N N | M M | 1 MM | $\mathrm{A} \quad 1 \mathrm{MM}$ | A M M D D | A M M D D | A M M D D | A M M D D |
| A $A \times \mathrm{D}$ D | A A D D | A A 2 D D | Y D D |  | $\mathrm{Y} \quad 0 \mathrm{O}$ D | Y O O D | Y O O D |
| A Y O O D | A Y O O D | A Y O O D | $\mathrm{Y} \quad 0 \mathrm{O}$ | Y 100 | Y 00 | C Y 00 | C Y O O |
| C Y O O B | C Y O O B | C Y O O B | C 2000 B | C 200 B | C 12 B | C C 122 B | C C 2 B |
| C C T B B | C C T B B | C C C T B B | C C C T B B | C C T B B | C C T B B | $3 \quad$ T B B | $3 \mathrm{~T} 1 \mathrm{Cl}^{3} \mathrm{~B}$ |
| 3 T T T 4 | 3 T T T 4 | 3 T T T 4 | 3 T T T 4 | 3 T T T 4 | 3 T T T 4 | T T T 4 | T T T 4 |
| move 24: | move 27: | move 30: | move 33: | move 36: | move 39: | move 42: | move 45: |
| \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ x \$ \$ | \$ \$ X \$ \$ |
| A A X N N | A A X N N | A A X N N | A A X N N | A A X N N | A A X N N | A A X N N | A A X N N |
| A M M D D | A M M D D | A M M D D | A 0 O M M | A O O M M | A 200 | A 2 B 00 | A 2 B 00 |
| Y O O D | Y 000 D | Y 000 D | Y O O D D | Y 00 | $\mathrm{Y} \quad 00$ | Y B B O O | Y B B O O |
| C Y O O B | Y O O B | $\mathrm{Y} \circ \bigcirc \mathrm{B}$ | $\mathrm{Y} \quad \mathrm{B} D$ | Y 2 B | $\mathrm{Y} \quad \mathrm{B} M \mathrm{M}$ | Y M M D D | Y M M |
| C C 2 B B | C $2 \quad \mathrm{~B} B$ | C 2 B B | C 2 BB | C B B D D | C B B D D | C D | C 14 |
| 3 T 1 | C C T 1 | C C T 1 | C C T 1 | C C T 1 D | C C T 1 D | C C T 1 | C CTD D |
| T T T 4 | 3 T T T 4 | 3 T T T 4 | 3 T T T 4 | 3 T T T 4 | 3 T T T 4 | 3 T T T 4 | 3 T T T D |
| move 48: | move 51: | move 54: | move 57: | move 60: | move 63: | move 66: | move 69: |
| \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ x \$ \$ | \$ \$ X \$ \$ |
| A A X N N | A A X 00 | A A X O O | A A X oo | A A X O O | A A X 00 | A A X O 0 | A A X O O |
| A 00 | A N NOO | A N N O O | A N N Oo | A N N O O | A N NOO | A N NOO | A N NOO |
| $\begin{array}{lllll}\mathrm{Y} & 2 & \mathrm{~B} & 0 & 0\end{array}$ | X 2 B | Y 2 B M M | Y 2 B M M | $\mathrm{Y} \quad \mathrm{M}$ M | Y M M D D | Y M M D D | M M D D |
| Y B B | Y B B | Y B B D D | Y B B D D | Y B 2 D D | Y B 2 T D | Y B 2 T T | 2 T D |
| C 114 4 M M | C 114 4 M M | C 1 | 4 T D | B B T D | B B T T T | B B T T T | Y T T T |
| C C T D D | C C T D D | C C T T T | C T T T | 4 C T T T | 4 C | 4 C 3 | $\begin{array}{llllll} \\ Y & B & 4 & C & 3\end{array}$ |
| 3 T T T | 3 T T T D | 3 | 1 C C 3 | 1 C C 3 | 1 C C 3 | 1 C C | B B 1 C C |
| move 72: | move 75: | move 78: | move 81: | move 84: | move 87: | move 90: | move 93: |
| \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ \$ \$ | \$ \$ \$ \$ | \$ \$ X \$ \$ |
| A A X 00 | A A X O 0 | A A X 0 O | A A X O o | A A X N N | A A 1 N N | A A 31 | A A X 31 |
| A N N O O | A N NOO | A N N O O | A N N O O | A 1 | A 3 | A $\mathrm{N} N$ | A M M N N |
| M M T D D | M M T D D | M M D D | M M 1 | M M 00 | M M X ooo | M M X ooo | 200 |
| 2 TTTD | 2 T T T D | 2 T D | 2 T 3 | 2 T 300 | 2 TXOO | 2 TX 00 | T 00 |
| Y | Y $4 \quad 1$ | T T T 1 | T T T D D | T T T D D | T T T D D | T T T D D | T T D D |
| $\begin{array}{lllll} \\ \mathrm{Y} & \mathrm{B} & 4 & \mathrm{C} & 3\end{array}$ | $\mathrm{X} \quad \mathrm{B} C \mathrm{C}$ | Y 4 B C 3 | Y 4 B C D | Y 4 B C C D | Y 4 B C D | Y 4 B C D | Y 4 B C C D |
| B B 1 C C | B B C C | Y B B C C | Y B B C C | Y B B C C | Y B B C C | Y B B C C | Y B B C C |
| move 96: | move 99: | move 102: | move 105: | move 108: | move 111: | move 114: | move 117: |
| \$ \$ X \$ \$ | \$ \$ x \$ \$ | \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ X \$ \$ | \$ \$ \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ |
| A A X 31 | A A X 31 |  | A A X 31 | A A X 31 | A A $\quad 1$ | A A 2 X | A A T 2 X |
| A M M N | A M M N N | A $\quad \mathrm{MM}$ | A T 2 MM | A T 2 | A T X 2 | A T T | A T T T X |
| T 200 | T 200 | T 2 N N | T T T N N | T T T | T T T X 3 | T T T 3 | 3 |
| T T TOO | T T TOO | T T T O O | $4 \quad 00$ | 400 MM | 400 MM | 400 MM | 400 MM |
| Y 4 D D | Y 4 | Y 4000 | $\mathrm{Y} \quad 00$ | Y O O N N | Y 0 O N | Y 0 O NN | Y O O N N |
| Y $\quad \mathrm{B} C \mathrm{C}$ D | Y B C C D D |  | Y B C C D D |  | $\begin{array}{llllll} \\ Y & B & C & D & D\end{array}$ | Y B C C D D | Y $\quad \mathrm{B} C \mathrm{C} E \mathrm{D}$ D |
| B B C C | B B C C D | B B C C D | B B C C D | B B C C D | B B C C D | B B C C D | B B C C D |
| move 120: | move 123: | move 126: | move 129: | move 132: | move 135: | move 138: | move 141: |
| \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ | \$ \$ 1 \$ \$ |
| A A T 2 X | A A T 2 | 3 A A T 2 | 3 A A T 2 | 3 A A T 2 | 3 A A T 2 | A A T 2 | A A 42 |
| A T T TX | A T T T | 4 ATT T | 4 A T T T | 4 A T T T | A T T T | A 4 T T T | A T |
| 300 | 300 X | 00 X | $\bigcirc \mathrm{O}$ ¢ M M | $\bigcirc 0 \times \mathrm{M}$ - | 4 M M | M M | M M T T |
| 400 | 400 X | 0 O X | 0 O X | $\bigcirc \mathrm{O} \mathrm{XNN}$ | 0 O NN | 3 O 0 NN | 300 NN |
| Y N N M M | Y N N M M | Y N N M M | Y N N | Y D D | Y O O D D | Y O O D D | Y O O D D |
| Y B C C D D | Y B C C D D | Y B C D D | Y B C D D | Y B C C | Y B X C D | Y B X C D | Y B X C D |
| B B C C D | B B C C D | B B C C D | B B C C D | B B C C | B B X C C | B B X C C | B B X C C |
| move 144: | move 147: | move 148: |  |  |  |  |  |
| \$ \$ 1 \$ \$ | \$ \$ \$ \$ | \$ \$ T \$ \$ |  |  |  |  |  |
| $\begin{array}{lllllll}\text { A } & \text { A } & 4 & \text { T } & 2\end{array}$ | 4 T T 2 | 4 T T T 2 |  |  |  |  |  |
| A T T T | 1 T T T |  |  |  |  |  |  |
| 3 MM | A A 3 MM | A A 3 MM |  |  |  |  |  |
| 0 ONN | A OON N | A 00 N N |  |  |  |  |  |
| Y O O D D | Y O O D D | Y O O D D |  |  |  |  |  |
| Y $\mathrm{B} \times \mathrm{X} C \mathrm{C}$ D | $\begin{array}{lllllll}\mathrm{Y} & \mathrm{B} & \mathrm{X} & \mathrm{C} & \mathrm{D}\end{array}$ | Y $\mathrm{B} \times \mathrm{X} C \mathrm{C}$ D |  |  |  |  |  |
| B B X C C | B B X C C | B B X C C |  |  |  |  |  |

