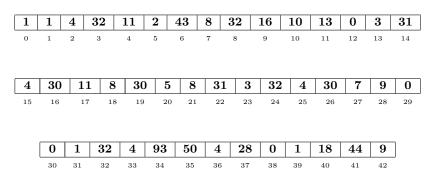
CENG111 Mock THE1 Test

Yiğithan Tamer November 15, 2020

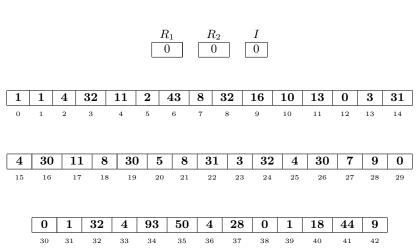
1 Problem

Using the instructions for the "THE Machine" and the number sequence given below, compute the final number sequence.



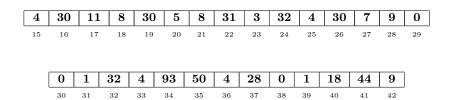
2 Solution

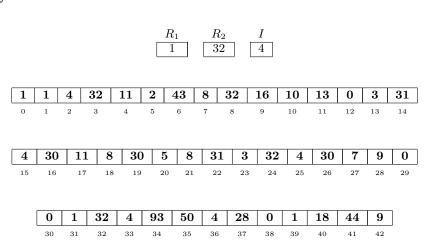
Cycle 1

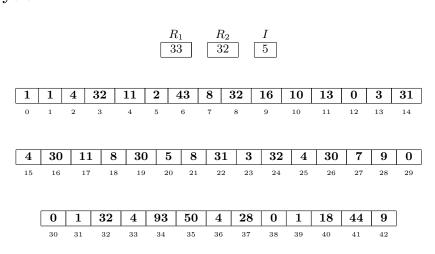


Cycle 2

1

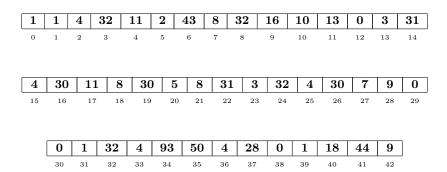


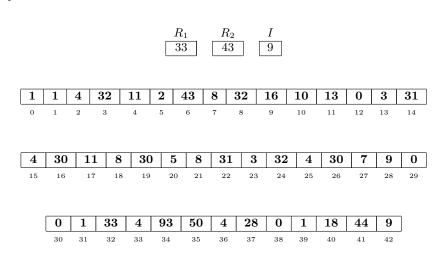


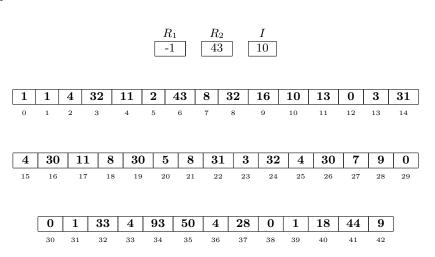


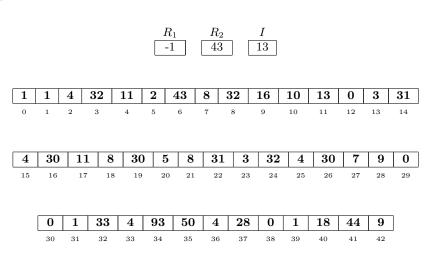
Cycle 5

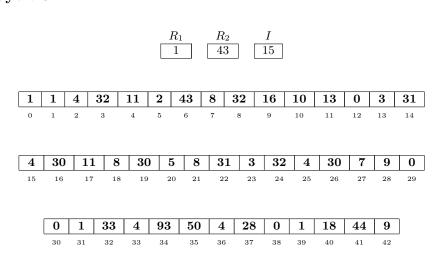
$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
33 & 43 & 7
\end{array}$$



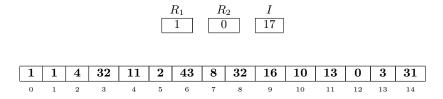


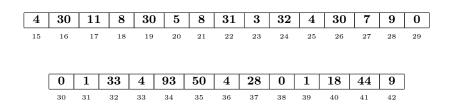


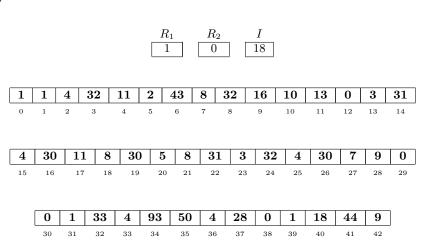




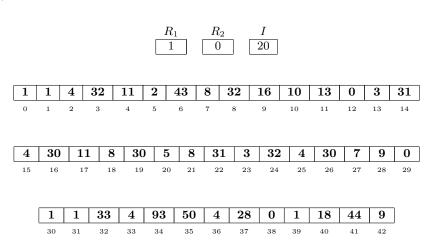
Cycle 10





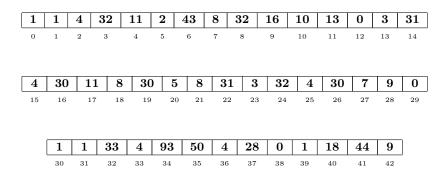


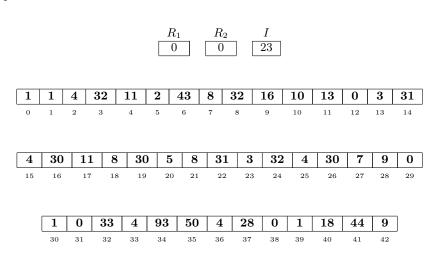
Cycle 12



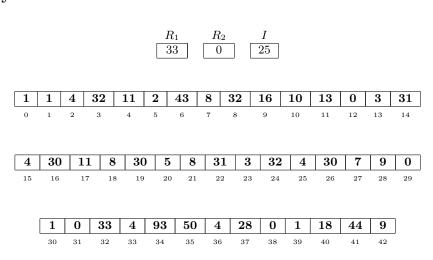
Cycle 13

$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
0 & 0 & 21
\end{array}$$

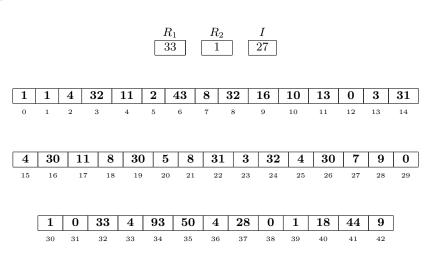




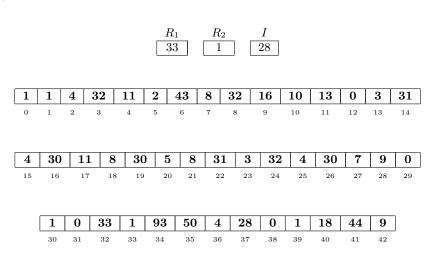
Cycle 15



Cycle 16

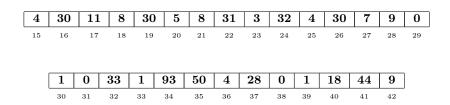


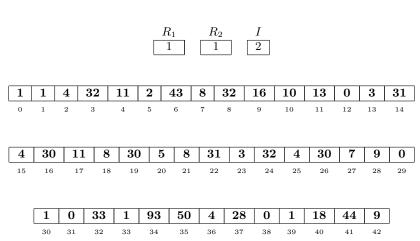
Cycle 17



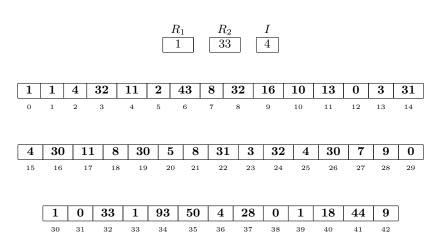
Cycle 18

 R_2



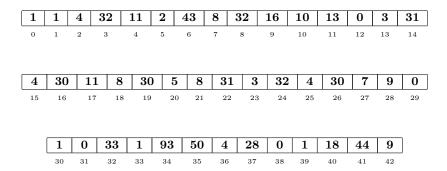


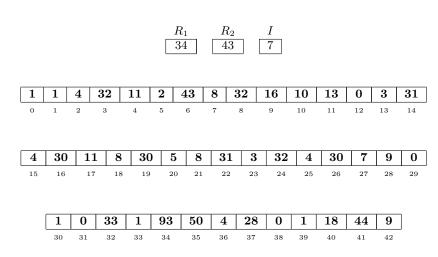
Cycle 20



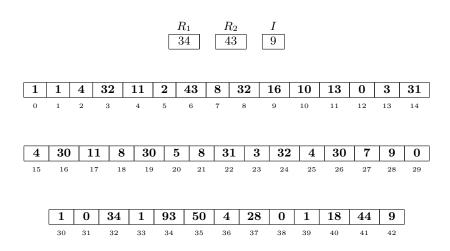
Cycle 21

$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
34 & 33 & 5
\end{array}$$

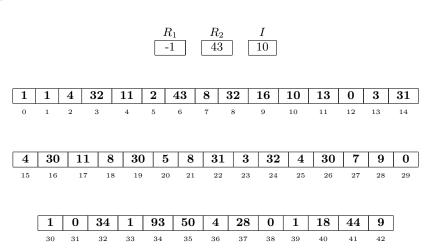




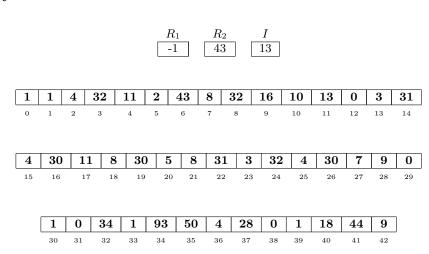
Cycle 23



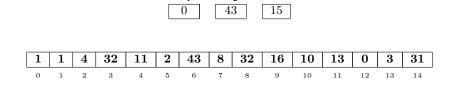
Cycle 24



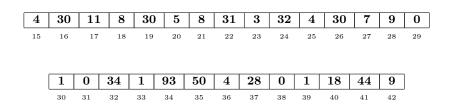
Cycle 25

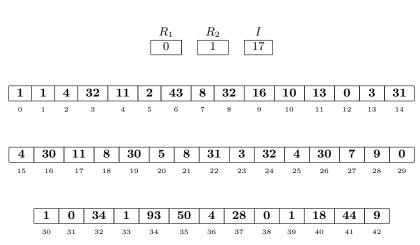


Cycle 26

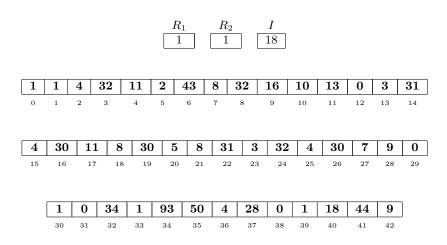


 R_2



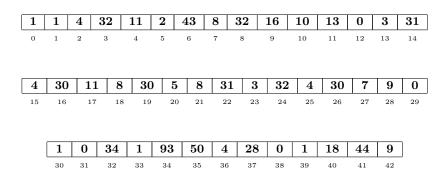


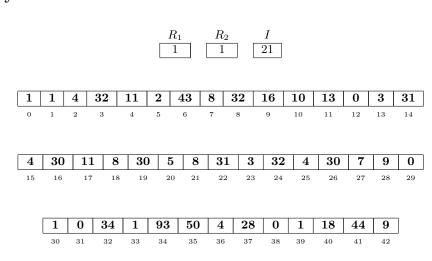
Cycle 28



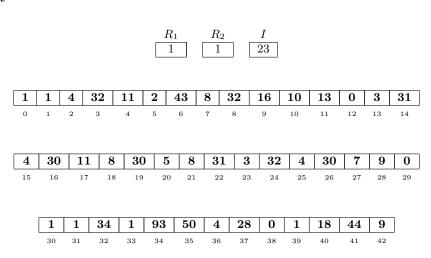
Cycle 29

$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
1 & 1 & 20
\end{array}$$

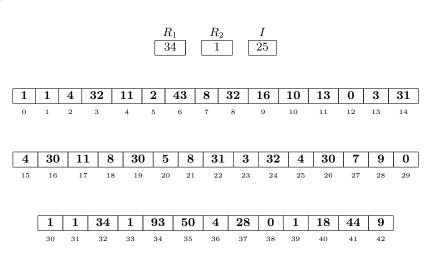




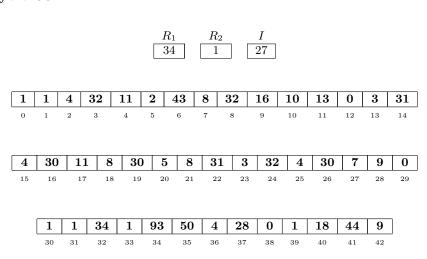
Cycle 31



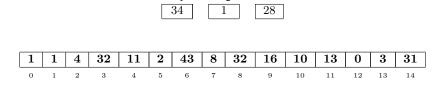
Cycle 32



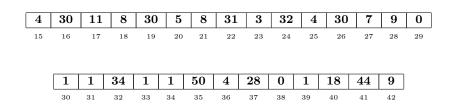
Cycle 33

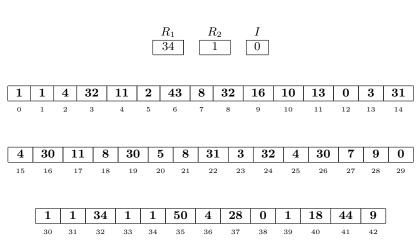


Cycle 34

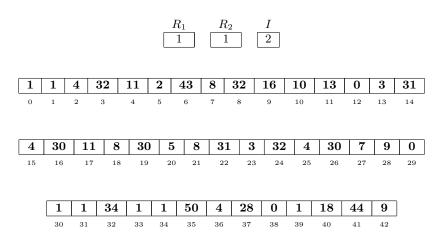


 R_2



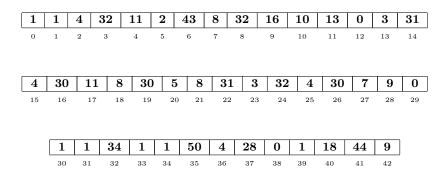


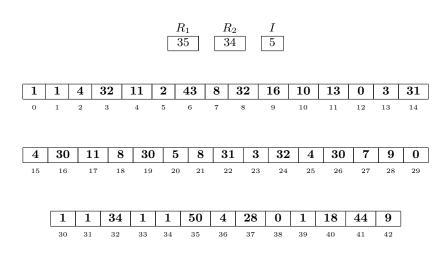
Cycle 36



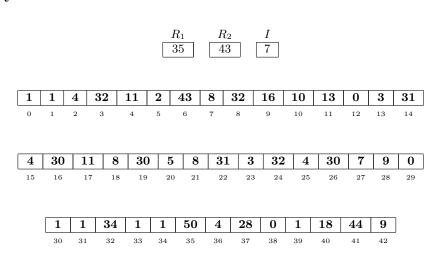
Cycle 37

$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
1 & 34 & 4
\end{array}$$

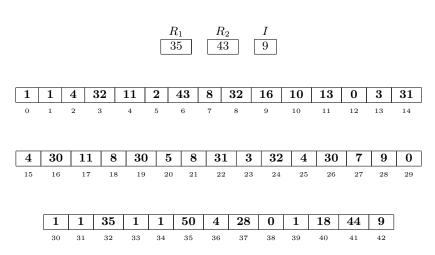




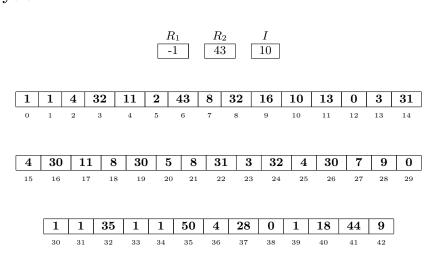
Cycle 39



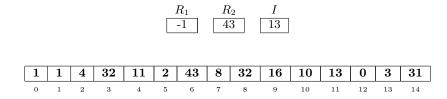
Cycle 40

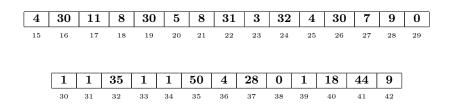


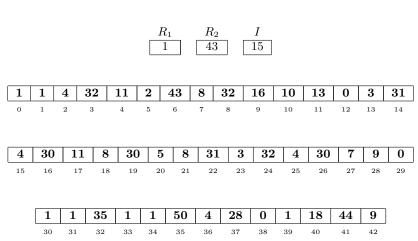
Cycle 41



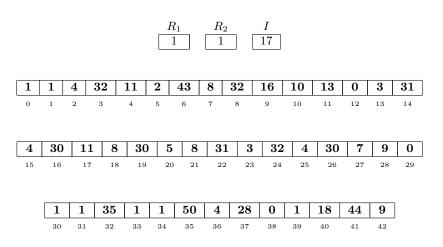
Cycle 42





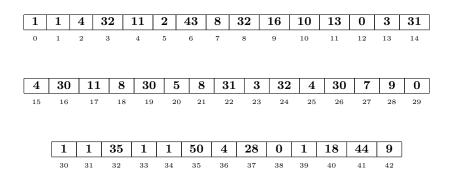


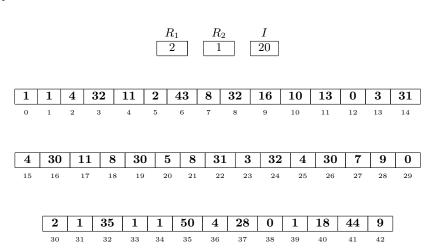
Cycle 44



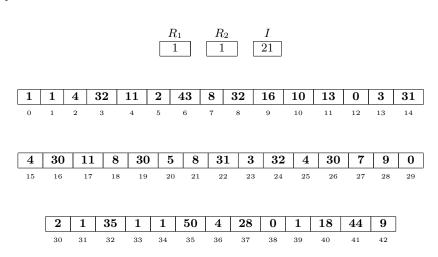
Cycle 45

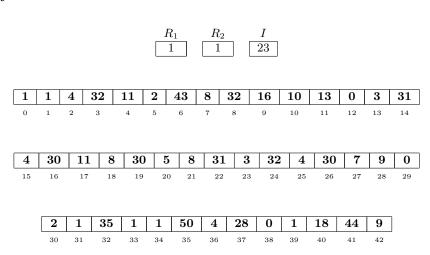
$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
2 & 1 & 18
\end{array}$$



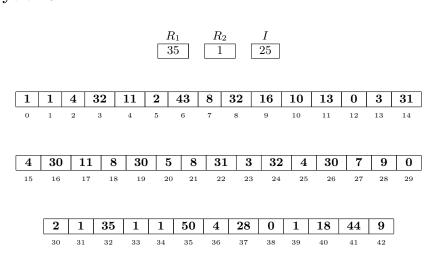


Cycle 47

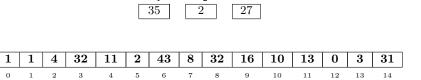




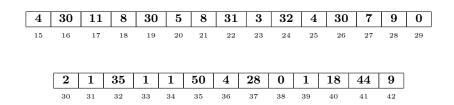
Cycle 49

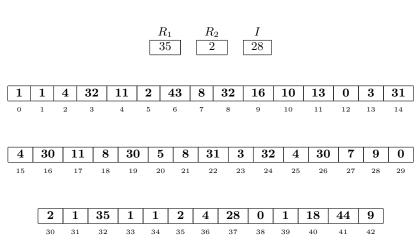


Cycle 50

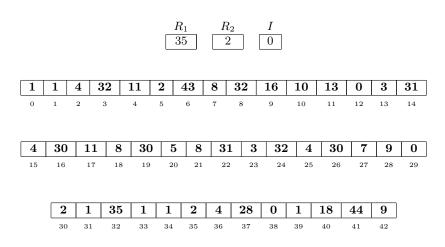


 R_2



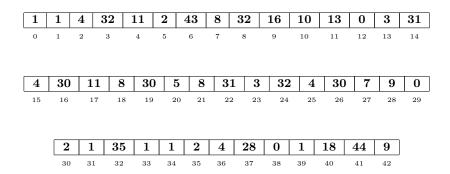


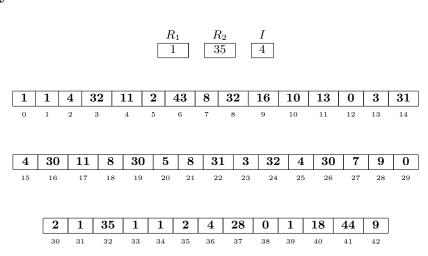
Cycle 52



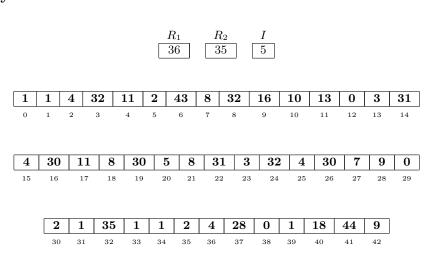
Cycle 53

$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
1 & 2 & 2
\end{array}$$

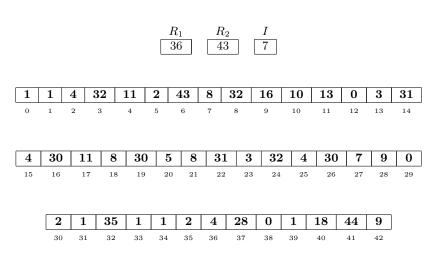




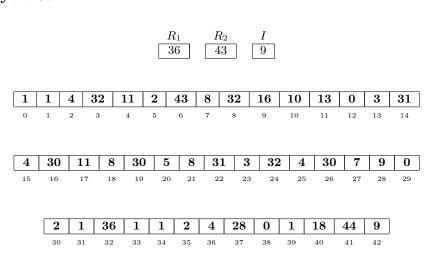
Cycle 55



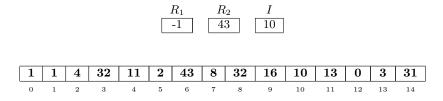
Cycle 56

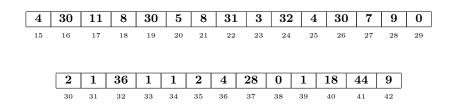


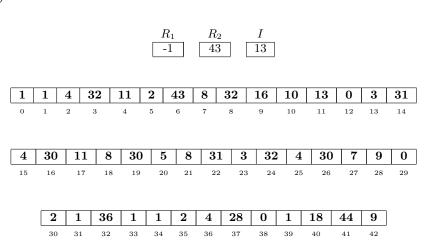
Cycle 57



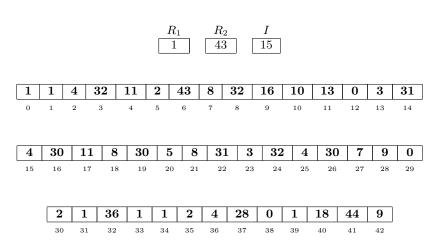
Cycle 58





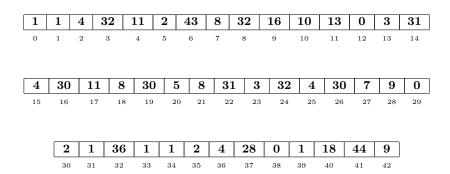


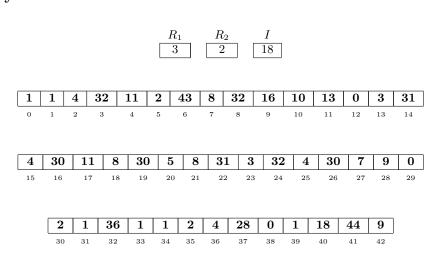
Cycle 60

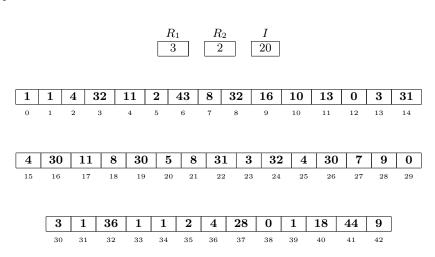


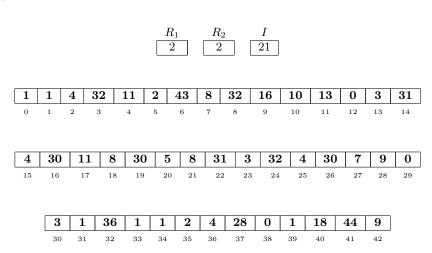
Cycle 61

$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
1 & 2 & 17
\end{array}$$

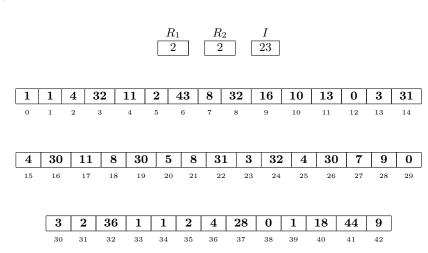




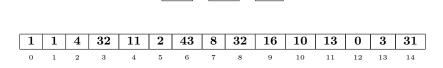




Cycle 65



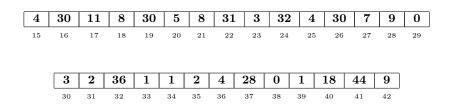
Cycle 66

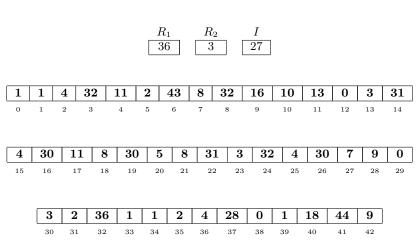


 R_2

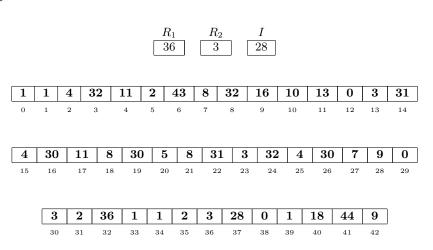
25

 $R_1 \over 36$



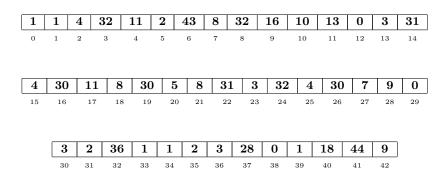


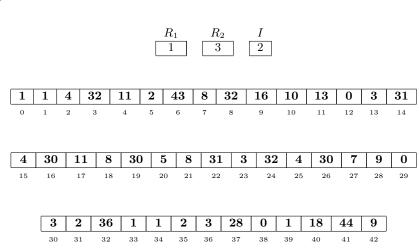
Cycle 68



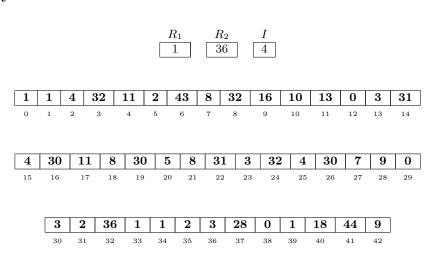
Cycle 69

$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
36 & 3 & 0
\end{array}$$

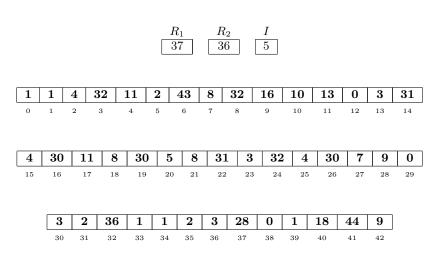




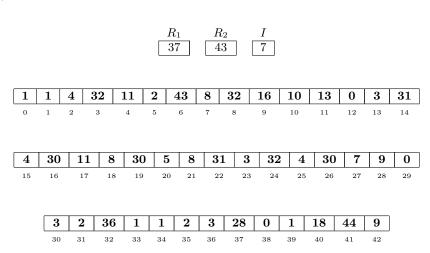
Cycle 71



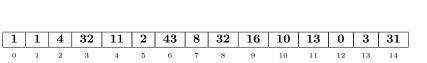
Cycle 72



Cycle 73



Cycle 74

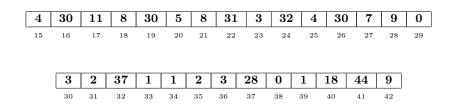


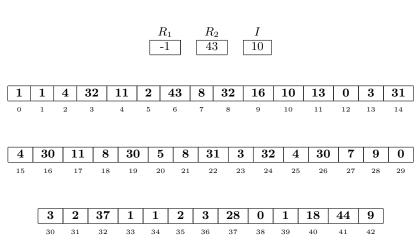
 R_2

43

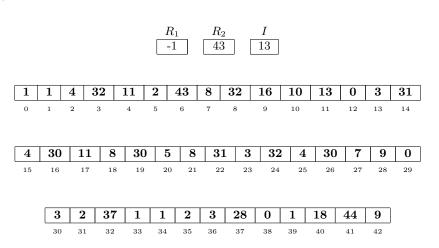
9

 $\frac{R_1}{37}$



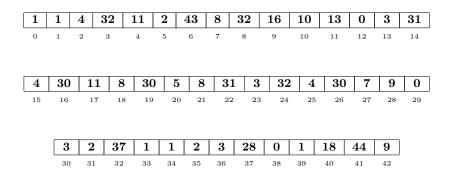


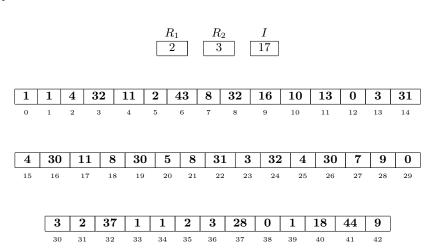
Cycle 76



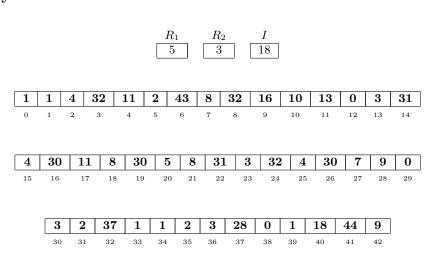
Cycle 77

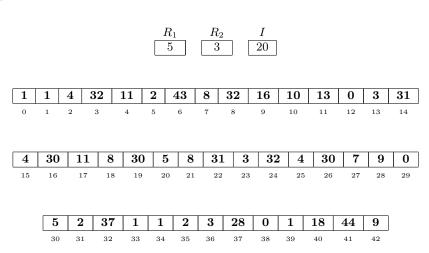
$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
2 & 43 & 15
\end{array}$$



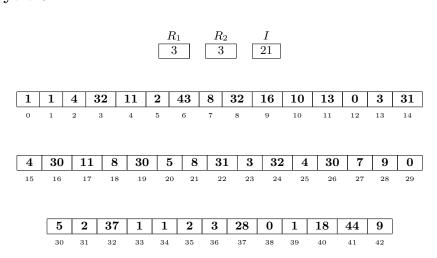


Cycle 79

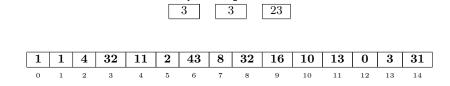




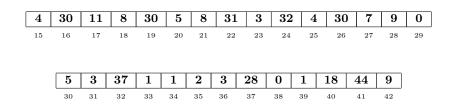
Cycle 81

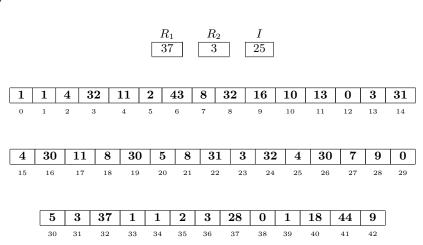


Cycle 82

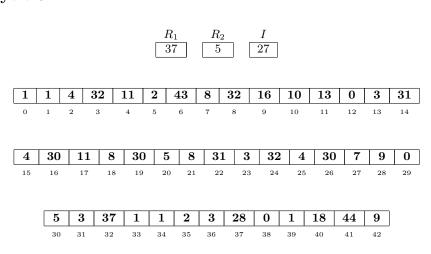


 R_2



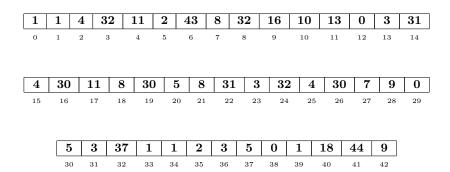


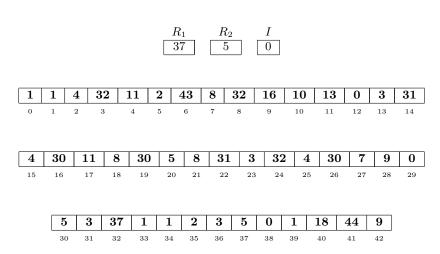
Cycle 84

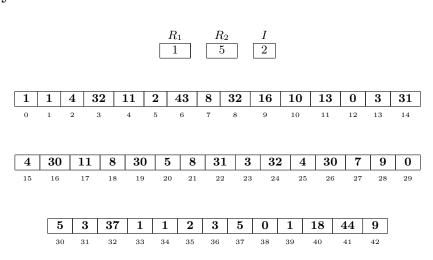


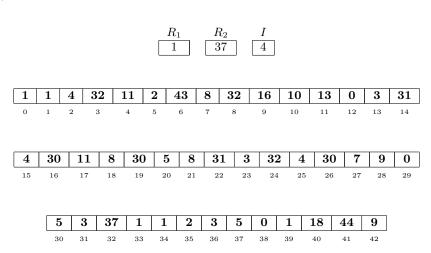
Cycle 85

$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
37 & 5 & 28
\end{array}$$

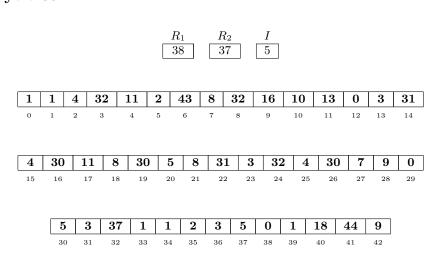




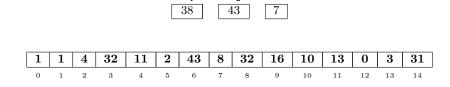




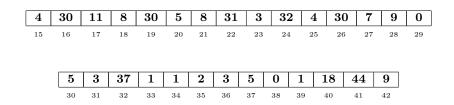
Cycle 89

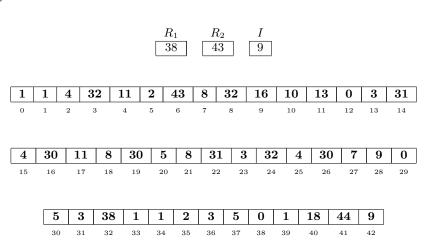


Cycle 90

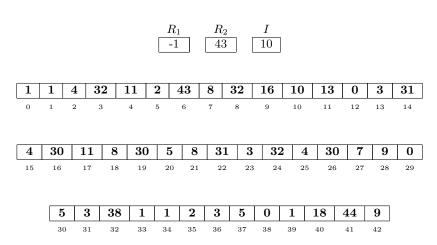


 R_2



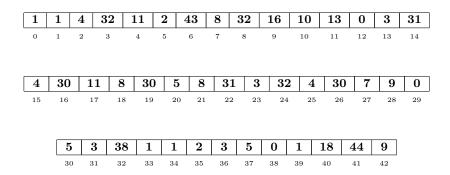


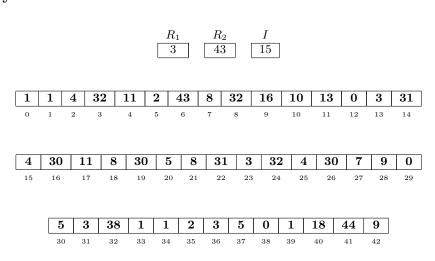
Cycle 92



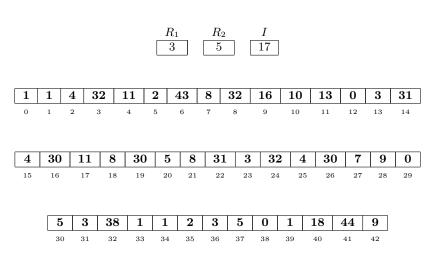
Cycle 93

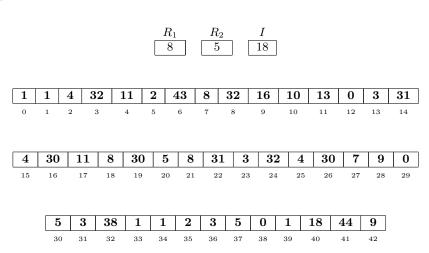
$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
-1 & 43 & 13
\end{array}$$



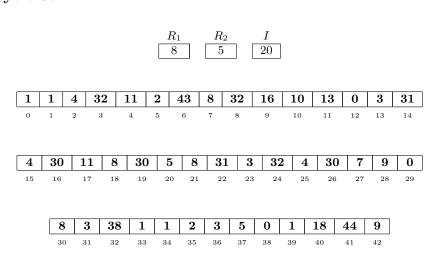


Cycle 95

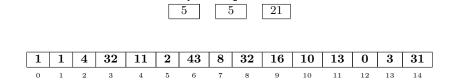




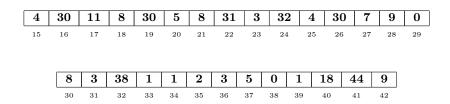
Cycle 97

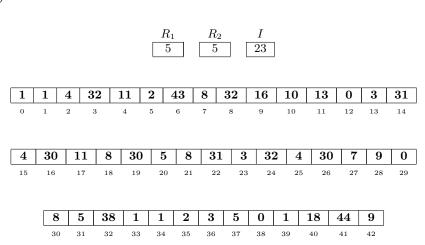


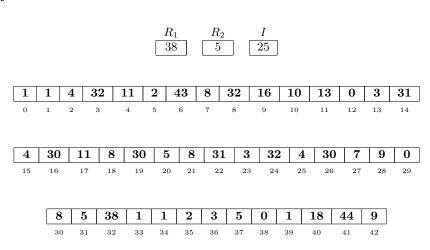
Cycle 98



 R_2

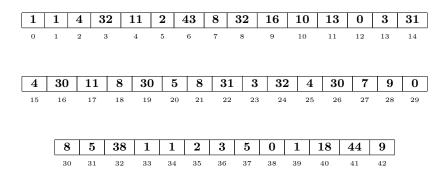


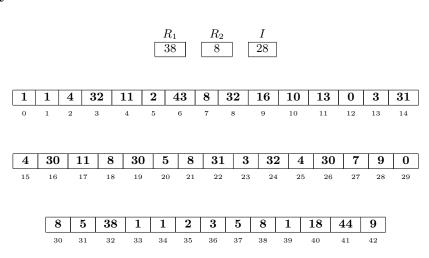


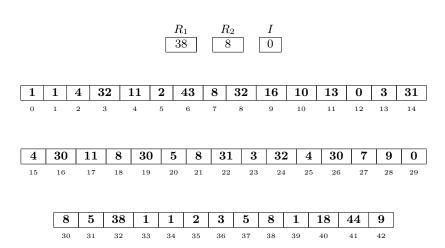


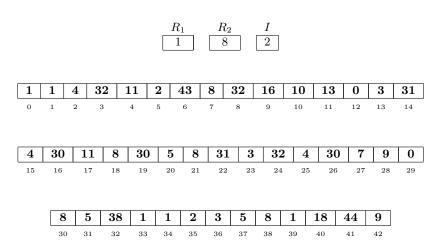
Cycle 101

$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
38 & 8 & 27
\end{array}$$

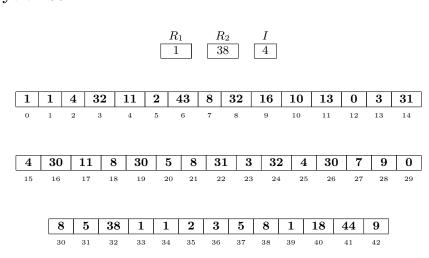


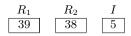


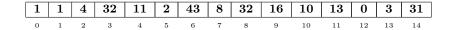


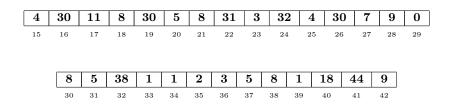


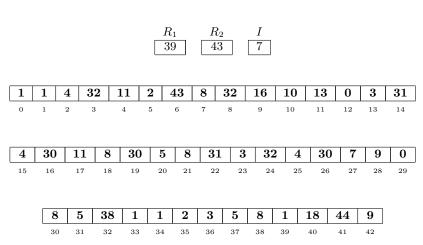
Cycle 105

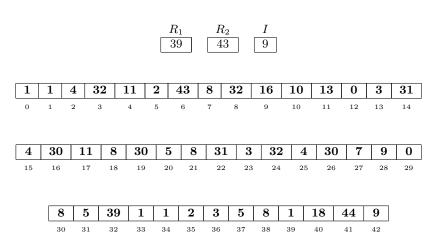






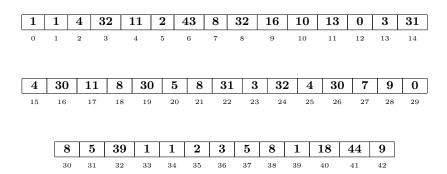


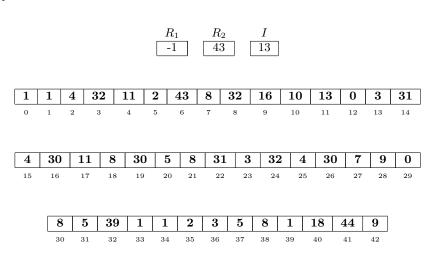


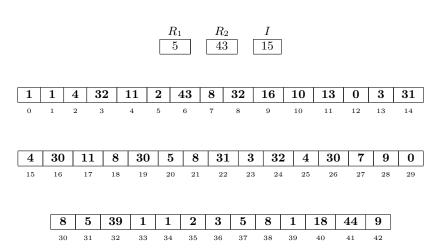


Cycle 109

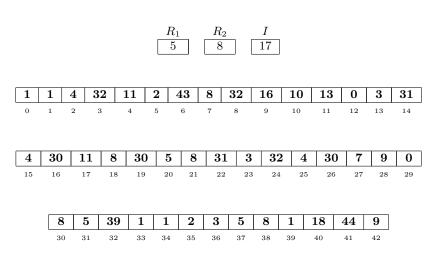
$$R_1$$
 R_2 I -1 43 10



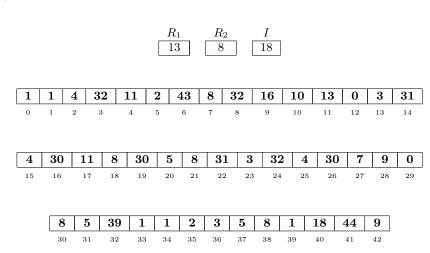




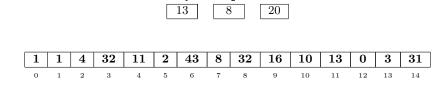
Cycle 112



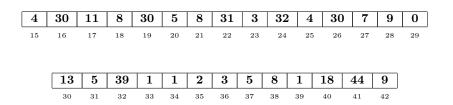
Cycle 113

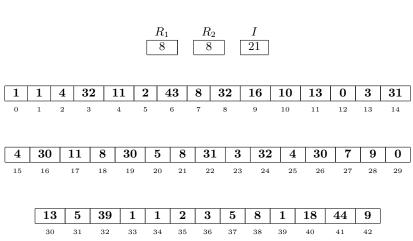


Cycle 114

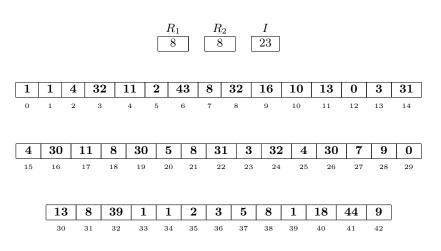


 R_2



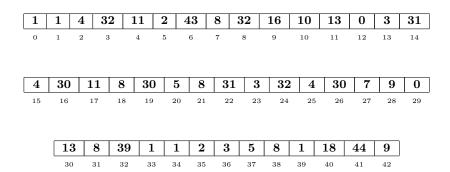


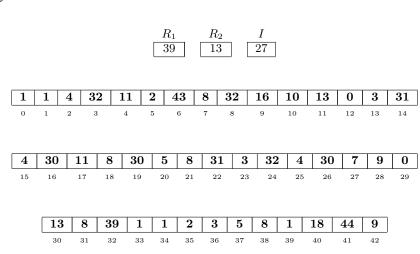
Cycle 116

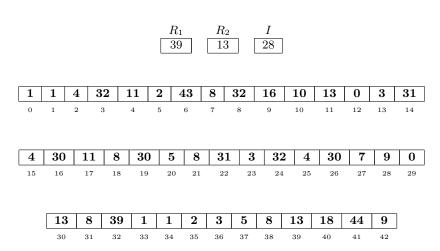


Cycle 117

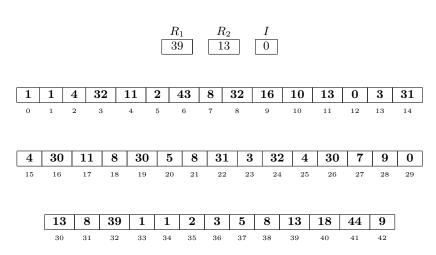
$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
39 & 8 & 25
\end{array}$$



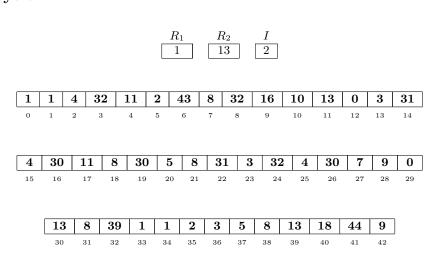




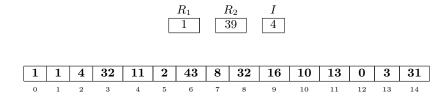
Cycle 120

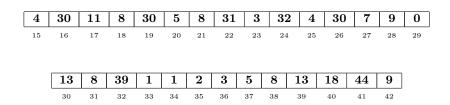


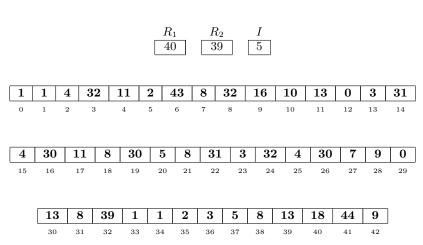
Cycle 121



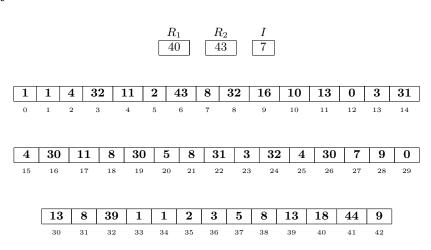
Cycle 122





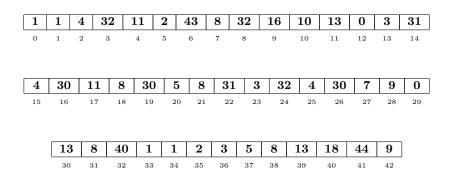


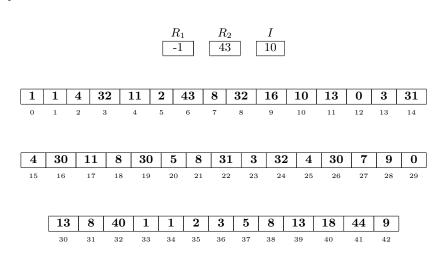
Cycle 124



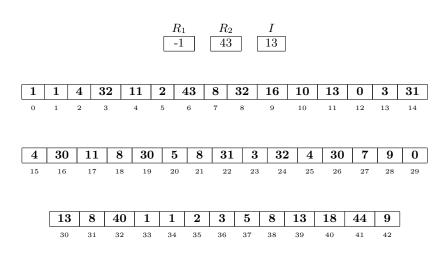
Cycle 125

$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
40 & 43 & 9
\end{array}$$

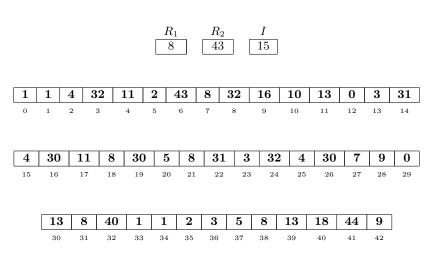




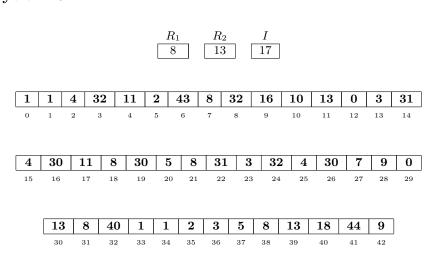
Cycle 127



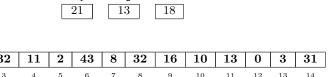
Cycle 128



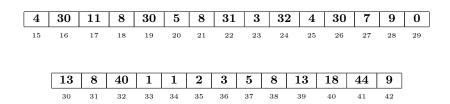
Cycle 129

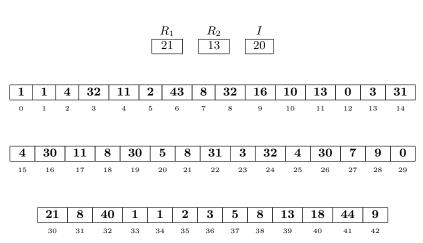


Cycle 130

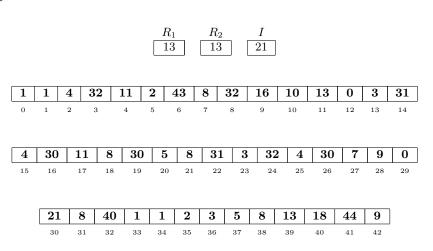


 R_2



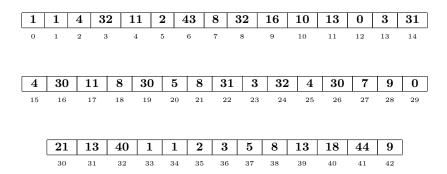


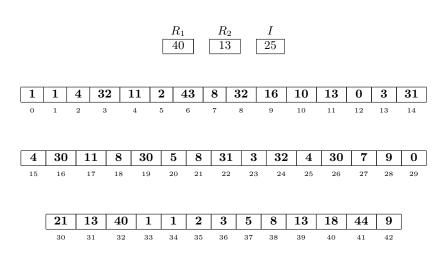
Cycle 132

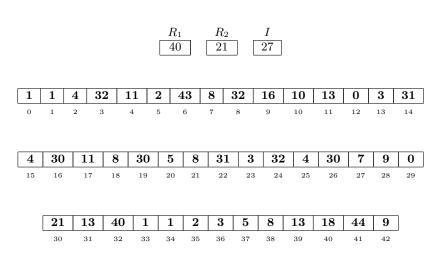


Cycle 133

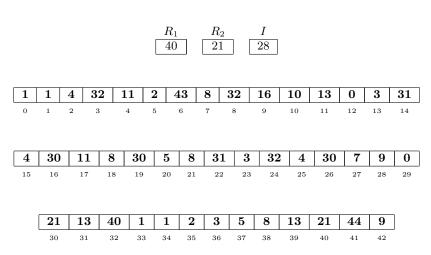
$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
13 & 13 & 23
\end{array}$$



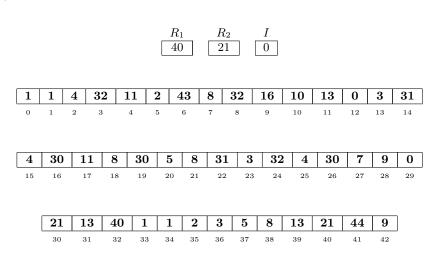




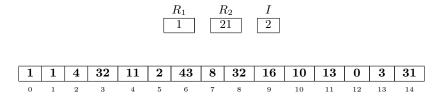
Cycle 136

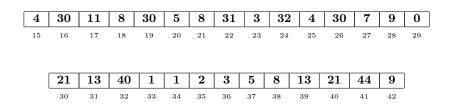


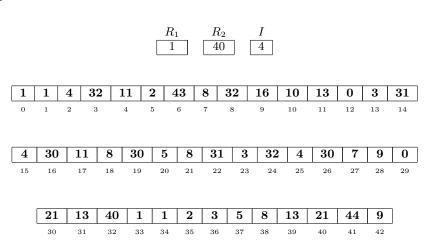
Cycle 137

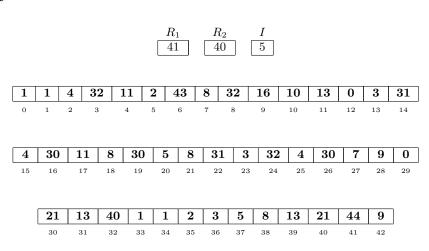


Cycle 138



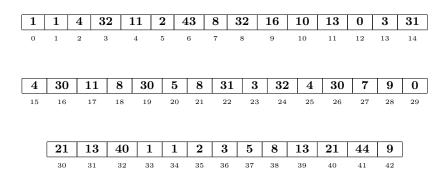


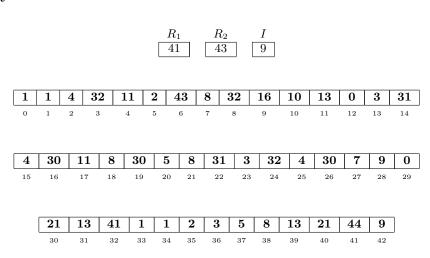


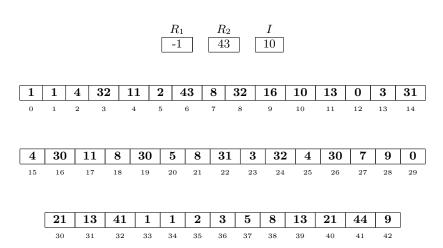


Cycle 141

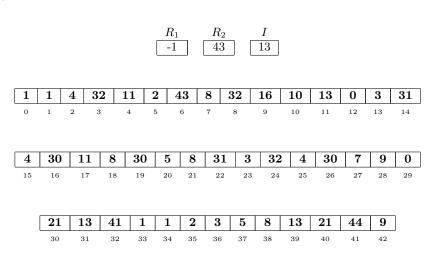
$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
41 & 43 & 7
\end{array}$$



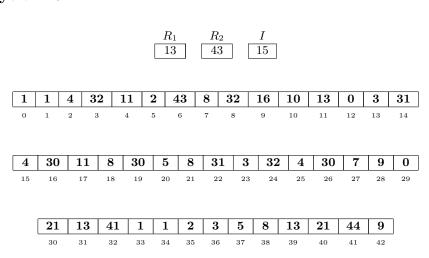




Cycle 144



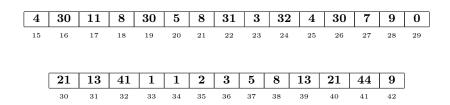
Cycle 145

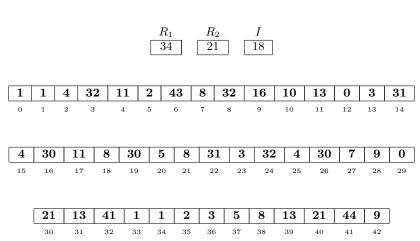


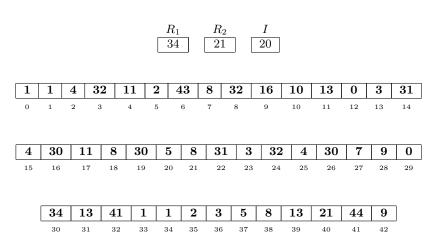
Cycle 146



 R_2

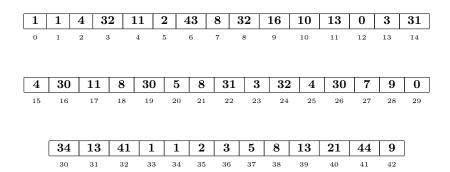


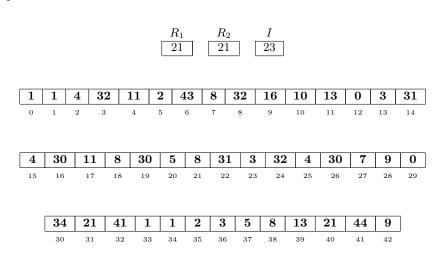


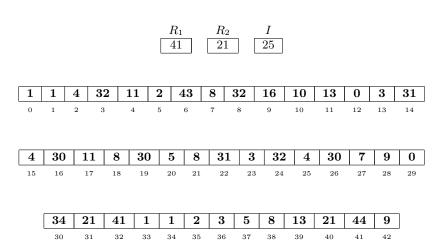


Cycle 149

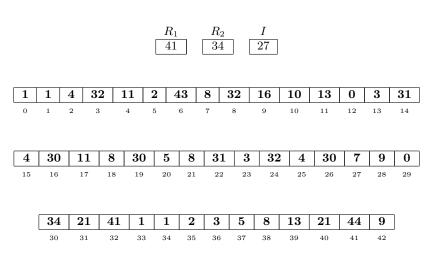
$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
21 & 21 & 21
\end{array}$$



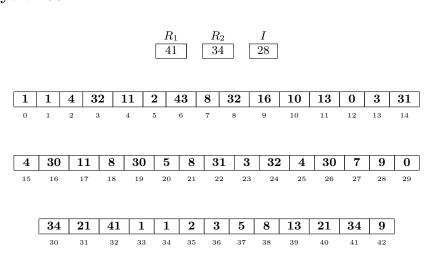




Cycle 152



Cycle 153

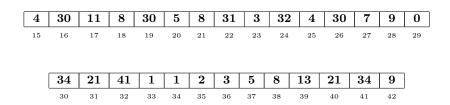


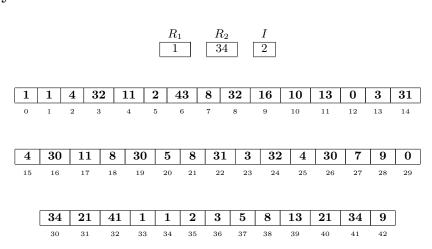
Cycle 154

 R_2

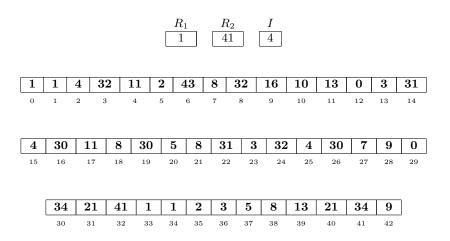
34

0



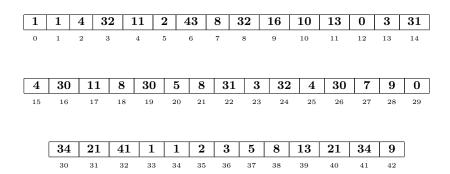


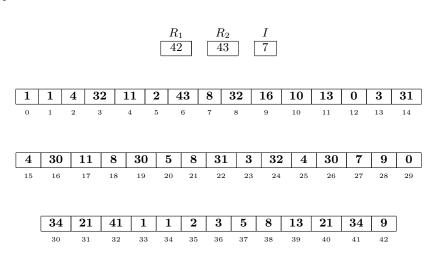
Cycle 156

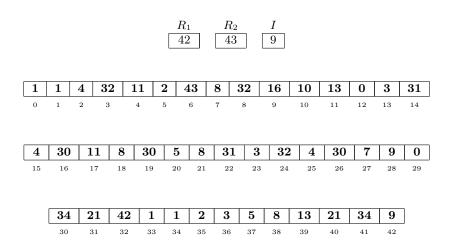


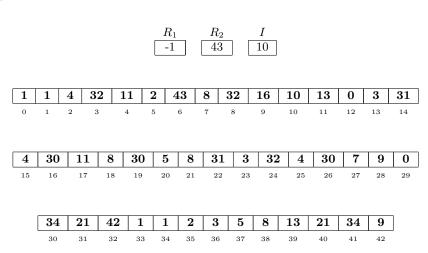
Cycle 157

$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
42 & 41 & 5
\end{array}$$

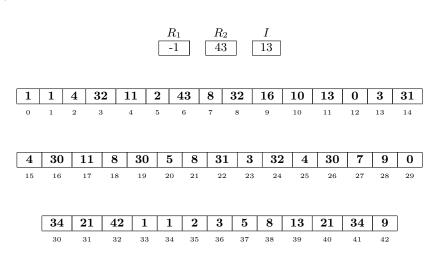






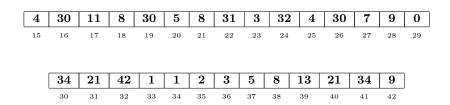


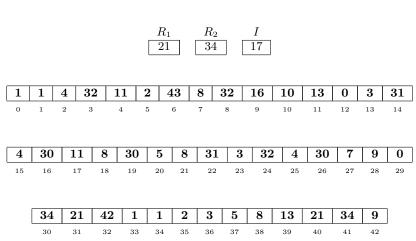
Cycle 161

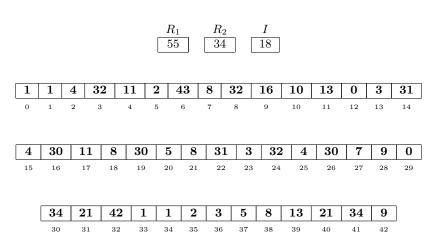


Cycle 162

 R_2

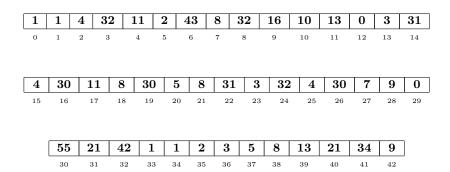


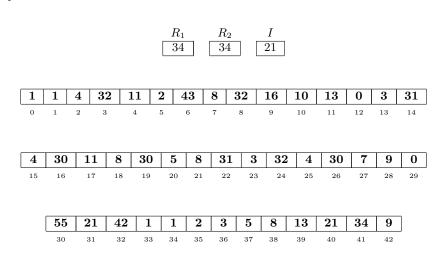


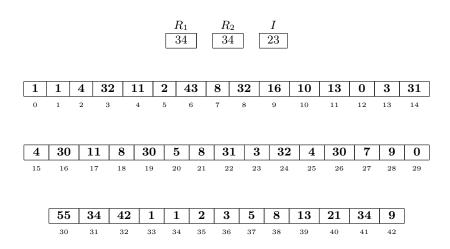


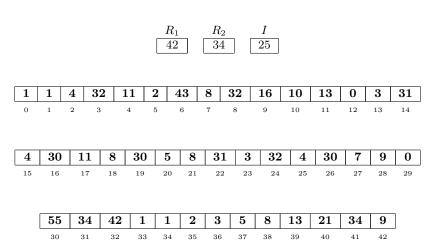
Cycle 165

$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
55 & 34 & 20
\end{array}$$

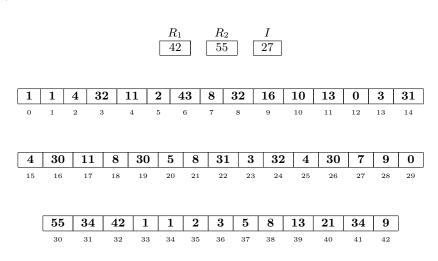




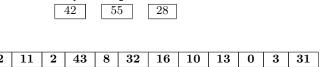




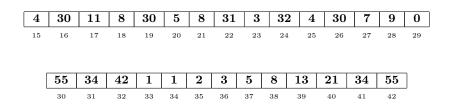
Cycle 169

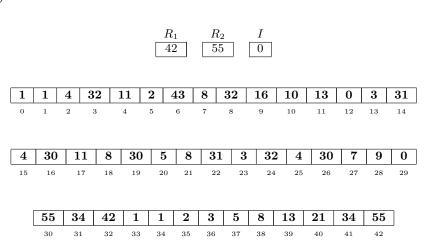


Cycle 170

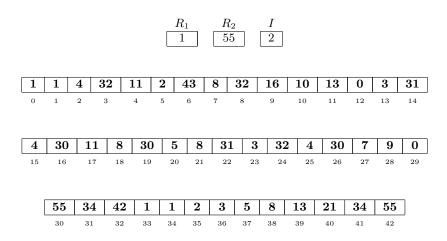


 R_2



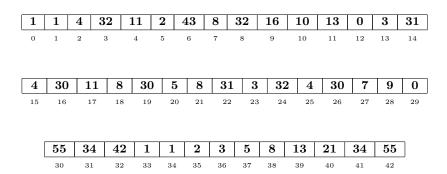


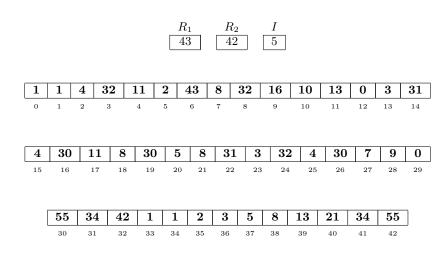
Cycle 172

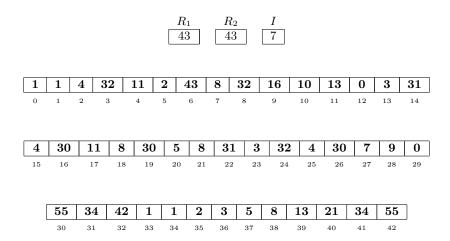


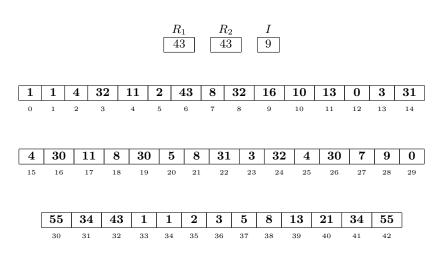
Cycle 173

$$\begin{array}{c|cc}
R_1 & R_2 & I \\
\hline
1 & 42 & 4
\end{array}$$

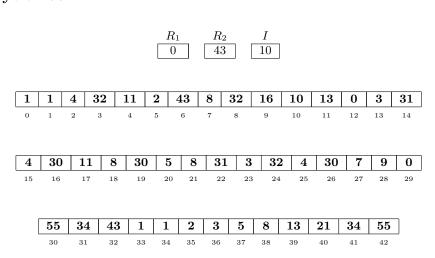




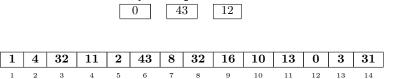




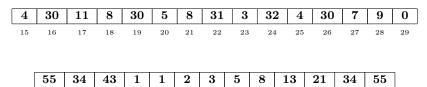
Cycle 177



Cycle 178



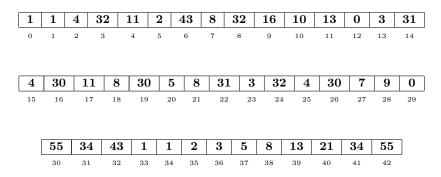
 R_2



30 31 32 33 34 35 36 37 38 39 40 41 42

3 Result

After 178 cycles, we obtain the following sequence.



We can observe that [33] to [42] are the first ten Fibonacci numbers. It can also be observed that if we increment [6] by x, we can obtain the first 10+x Fibonacci numbers at the end of this sequence.