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$C = I[i+1/i]$ $D = I[r+p/r, i+1/i]$
$E = I[2*p/p, r+p/r, i+1/i]$.
$F = I[r-p/r, 2*p/p, r+p/r, i+1/i]$

$\frac{\{A\}S_1\{B\} \quad \{B\}S_2\{C\}}{\{A\}S_1;S_2\{C\}}$

$\frac{\{I \wedge b\}\, s\, \{I\}}{\{I\}\text{ while } b \text{ do } s\ \{I \wedge \neg b\}}$

$$\frac{\dfrac{\dfrac{\{F\}\ r=r-p\ \{E\} \quad \{E\}\ p=2*p\ \{D\}}{\{D\}\ r=r+p\ \{C\}} \quad \{C\}\ i=i+1\ \{I\}}{\{I \wedge i \neq n\}\ r=r-p;\ p=2*p;\ r=r+p;\ i=i+1\ \{I\}}}{\dfrac{A \Rightarrow I \quad \{I\}P\{I \wedge i=n\} \quad I \wedge i=n \Rightarrow B}{\{n \geq 0 \wedge r=0 \wedge i=0 \wedge p=1\}\ P\ \{r=2^n-1\}}}$$

A B

Apply rule of Consequence

The constraints are

$$\begin{cases} A \Rightarrow I \\ I \wedge i=n \Rightarrow B \\ I \wedge i \neq n \Rightarrow F \end{cases}$$

Let I be $p=2^i \wedge r=2^i-1 \wedge i \leq n$

Then

① $n \geq 0 \Rightarrow I[0/r, 0/i, 1/p]$

② $p=2^i \wedge r=2^i-1 \wedge i \leq n \wedge i=n$
$\Rightarrow r=2^n-1$

③ $p=2^i \wedge r=2^i-1 \wedge i \leq n \wedge i \neq n \Rightarrow$
$r-p=-1 \wedge 2p=2^{i+1} \wedge r+p=2^{i+1}-1 \wedge i+1 \leq n$

Since all constraints are satisfied, the program is correct!