Parcial 2

1)

linea	nombre del estado	estado/guardas	aclaracion
-	σ_0	$x \mapsto 20, r \mapsto 21, y \mapsto 22$	Estado inicial
ℓ_1	σ_1	$x \mapsto 20, r \mapsto 0, y \mapsto 1$	
ℓ_2		$True$	
ℓ_3	σ_2	$x \mapsto 20, r \mapsto 1, y \mapsto 2$	
ℓ_2		$True$	
ℓ_3	σ_3	$x \mapsto 20, r \mapsto 2, y \mapsto 4$	
ℓ_2		$True$	
ℓ_3	σ_4	$x \mapsto 20, r \mapsto 3, y \mapsto 8$	
ℓ_2		$True$	
ℓ_3	σ_5	$x \mapsto 20, r \mapsto 4, y \mapsto 16$	
ℓ_2		$True$	
ℓ_3	σ_6	$x \mapsto 20, r \mapsto 5, y \mapsto 32$	
ℓ_2		$False$	
ℓ_5	σ_7	$x \mapsto 20, r \mapsto 5, y \mapsto 12$	Estado final

2)

$$
\begin{aligned}
&\langle \Sigma i : 0 \leq i < N/2 : A.(2*i) \rangle \\
&\equiv \{\text{A=[1,2,3,4,5,6]}\} \\
&\langle \Sigma i : 0 \leq i < 3 : A.(2*i) \rangle \\
&\equiv \{\text{Evaluo rango}\} \\
&\langle \Sigma i : i \in \{0,1,2\} \quad : A.(2*i) \rangle \\
&\equiv \{\text{Evaluo termino con el rango}\} \\
&A.(2*0) + \quad A.(2*1) + A.(2*2) \\
&\equiv \{\text{Aritmetica}\} \\
&A.(0) + \quad A.(2) + A.(4)
\end{aligned}
$$

3)

$(n\ mod\ 2 \equiv 0 \lor n\ mod\ 3 \equiv 0)$
$\land (n\ mod\ 2 \equiv 0 \Rightarrow wp.(r, n := r+1, n+1).(r = \langle N\ i : 0 \leq i < n : i\ mod\ 2 \equiv 0 \lor i\ mod\ 3 \equiv 0\rangle))$
$\land (n\ mod\ 3 \equiv 0 \Rightarrow wp.(r, n := r+1, n+1).(r = \langle N\ i : 0 \leq i < n : i\ mod\ 2 \equiv 0 \lor i\ mod\ 3 \equiv 0\rangle)$
$\equiv$ {Suponemos antecedente y demostramos consecuente}
$(n\ mod\ 2 \equiv 0 \lor n\ mod\ 3 \equiv 0)$
$\land wp.(r, n := r+1, n+1).(r = \langle N\ i : 0 \leq i < n : i\ mod\ 2 \equiv 0 \lor i\ mod\ 3 \equiv 0\rangle)$
$\land wp.(r, n := r+1, n+1).(r = \langle N\ i : 0 \leq i < n : i\ mod\ 2 \equiv 0 \lor i\ mod\ 3 \equiv 0\rangle$
$\equiv$ {wp asignacion}
$(n\ mod\ 2 \equiv 0 \lor n\ mod\ 3 \equiv 0)$
$\land (r+1 = \langle N\ i : 0 \leq i < n+1 : i\ mod\ 2 \equiv 0 \lor i\ mod\ 3 \equiv 0\rangle)$
$\land (r+1 = \langle N\ i : 0 \leq i < n+1 : i\ mod\ 2 \equiv 0 \lor i\ mod\ 3 \equiv 0\rangle$
$\equiv$ {Logica}
$r = \langle N\ i : 0 \leq i < n : i\ mod\ 2 \equiv 0 \lor i\ mod\ 3 \equiv 0\rangle$

d)

$2 = \langle N\ i : 0 \leq i < 3 : i\ mod\ 2 \equiv 0 \lor i\ mod\ 3 \equiv 0\rangle$
$\equiv$ {Evaluo rango}
$2 = \langle N\ i : i \in \{0, 1, 2\} : i\ mod\ 2 \equiv 0 \lor i\ mod\ 3 \equiv 0\rangle$
$\equiv$ {Evaluo termino en el rango}
$2 = (0\ mod\ 2 \equiv 0 \lor 0\ mod\ 3 \equiv 0) + (1\ mod\ 2 \equiv 0 \lor 1\ mod\ 3 \equiv 0) + (2\ mod\ 2 \equiv 0 \lor 2\ mod\ 3 \equiv 0)$
$\equiv$ {Evaluo}
$2 = 1 + 0 + (True \lor 2\ mod\ 3 \equiv 0)$
$\equiv$ {Logica}
$2 = 1 + 0 + 1$
$\equiv$ {Aritmetica}
$2 = 2$
$\equiv$ {True}

4)

Encontrar Invariante

$I : 0 \leq n \leq N{-}1 \land u = sum.A.0.n \land r = \langle \exists i : 0 \leq i < n : sum.A.0.i = 3 \land A.i = 3\rangle$

Inicializacion

$\{N > 0\}$
$r, u, n := False, 0, 0;$
$\{0 \leq n \leq N - 1 \wedge u = sum.A.0.n \wedge r = \langle \exists i : 0 \leq i < n : sum.A.0.i = 3 \wedge A.i = 3 \rangle\}$

Finalizacion

$0 \leq n \leq N - 1 \wedge u = sum.A.0.n \wedge r = \langle \exists i : 0 \leq i < n : sum.A.0.i = 3 \wedge A.i = 3 \rangle \wedge \neg B$
$\Rightarrow r = \langle \exists i : 0 \leq i < N : sum.A.0.i = 3 \wedge A.i = 3 \rangle$