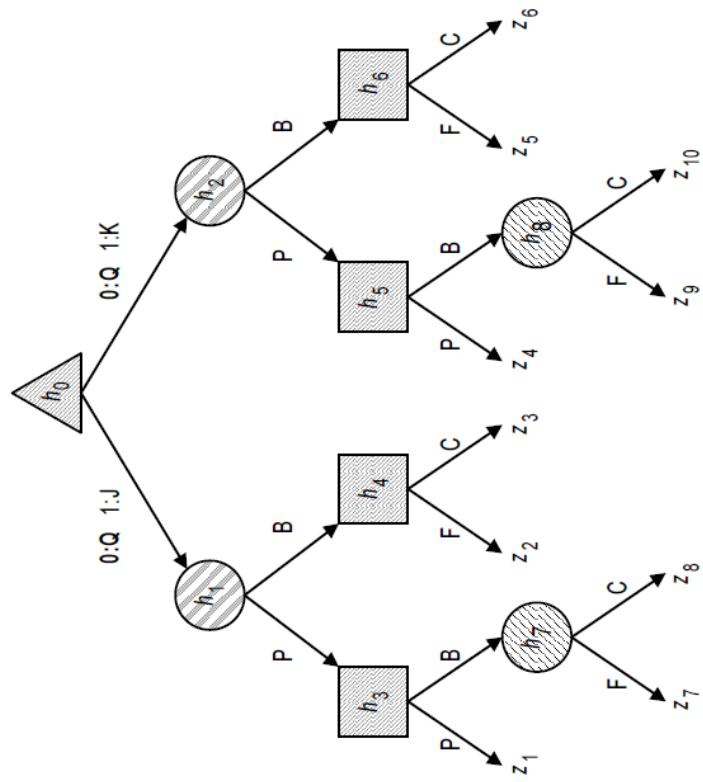


102



104

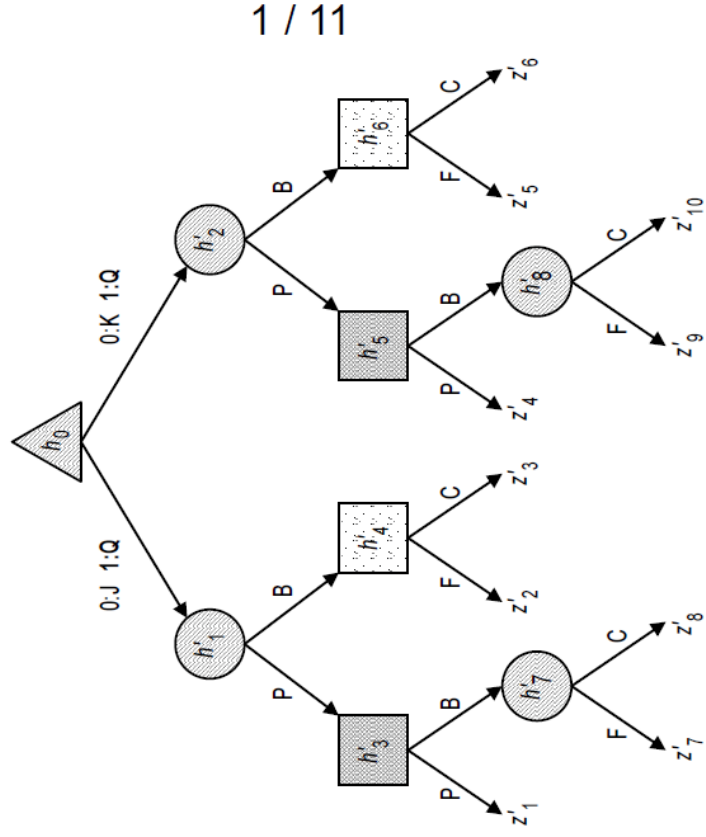


FIG. 1

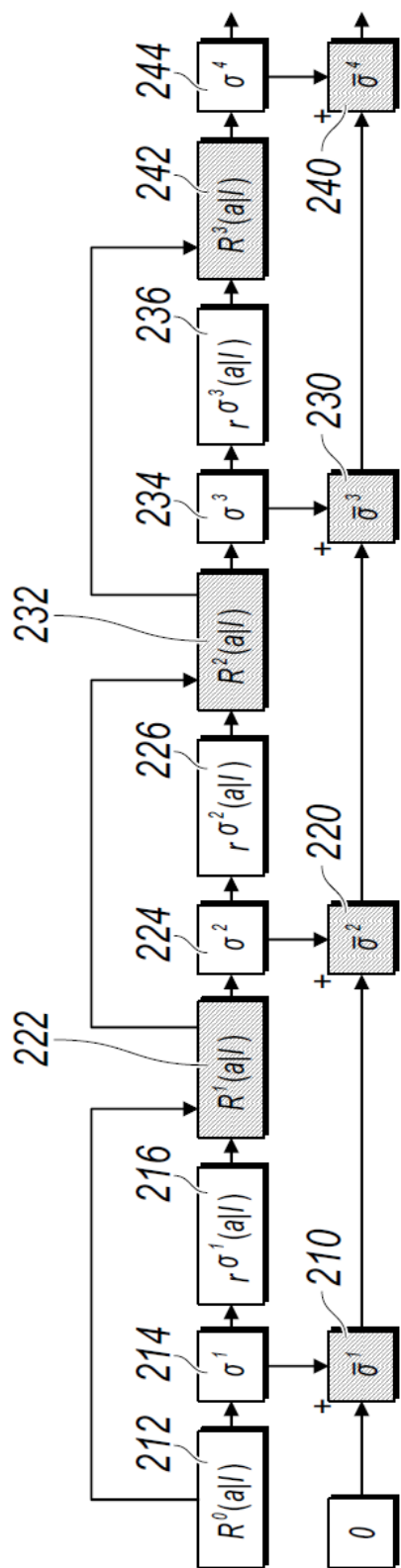


FIG. 2A

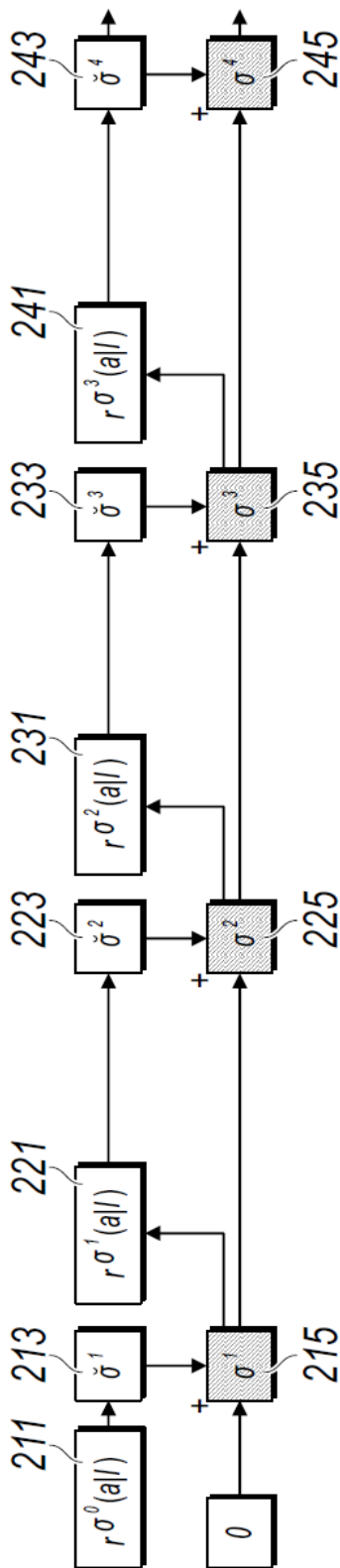


FIG. 2B

Algorithm 1: Streamline CFR with Simultaneous Updating

```

1 Function SCFR( $t, h, \pi_0, \pi_1$ ):
2    $i = P(h)$ 
3    $l_i \leftarrow l_i(h)$ 
4   if  $h \in Z$  then
5     return  $[\vec{u}_0(l_i) \circ \vec{\pi}_0, \vec{\pi}_1(l_i), \vec{u}_1(l_i) \circ \vec{\pi}_0, \vec{\pi}_1(l_i)]$ 
6   else if  $P(h) = -1$  then
7      $v \leftarrow [\vec{0}, \vec{0}]$ 
8     For  $a \in A(l_i)$  do
9        $v' \leftarrow \text{SCFR}(t, ha, \pi_0, \pi_1)$ 
10       $v \leftarrow v + v' \sigma_i^t(a|l_i)$ 
11     return  $v$ 
12   else
13      $v \leftarrow [\vec{0}, \vec{0}], \vec{v}^t(\cdot|l_i) \leftarrow \vec{0}, r^t(\cdot|l_i) \leftarrow \vec{0}$ 
14     For  $a \in A(l_i)$  do
15       if  $i = 0$  then
16          $v' \leftarrow \text{SCFR}(t, ha, \pi_0 \sigma_0^t(a|l_0), \pi_1)$ 
17          $\vec{v}^t(a|l_i) \leftarrow v'[0]$ 
18          $v \leftarrow v + [v'[0] \sigma_i^t(a|l_i), v'[1]]$ 
19       else
20          $v' \leftarrow \text{SCFR}(t, ha, \pi_0, \pi_1 \sigma_1^t(a|l_1))$ 
21          $\vec{v}^t(a|l_i) \leftarrow v'[1]$ 
22          $v \leftarrow v + [v'[0], v'[1] \sigma_i^t(a|l_i)]$ 
23     For  $a \in A(l_i)$  do
24        $\vec{r}^t(a|l_i) \leftarrow \vec{v}^t(a|l_i) - v[i]$ 
25        $\check{\sigma}_i(l_i) \leftarrow \text{CalculateStrategy}(\vec{r}^t(\cdot|l_i), l_i)$ 
26        $\check{\sigma}_i^{t+1}(l_i) \leftarrow (1 - a(t)) \sigma_i^t(l_i) + a(t) \check{\sigma}_i(l_i)$ 
27     return  $v$ 
28
29 Function CalculateStrategy( $R_i(\cdot|l_i), l_i$ ):
30    $sum \leftarrow \sum_{a \in A(l_i)} \max(R_i(a|l_i), 0)$ 
31   For  $a \in A(l_i)$  do
32      $\sigma_i(a|l_i) = \frac{\max(R_i(a|l_i), 0)}{sum}$  if  $sum > 0$  else  $\frac{1}{|A(l_i)|}$ 
33   return  $\sigma_i(l_i)$ 
34

```

FIG. 3

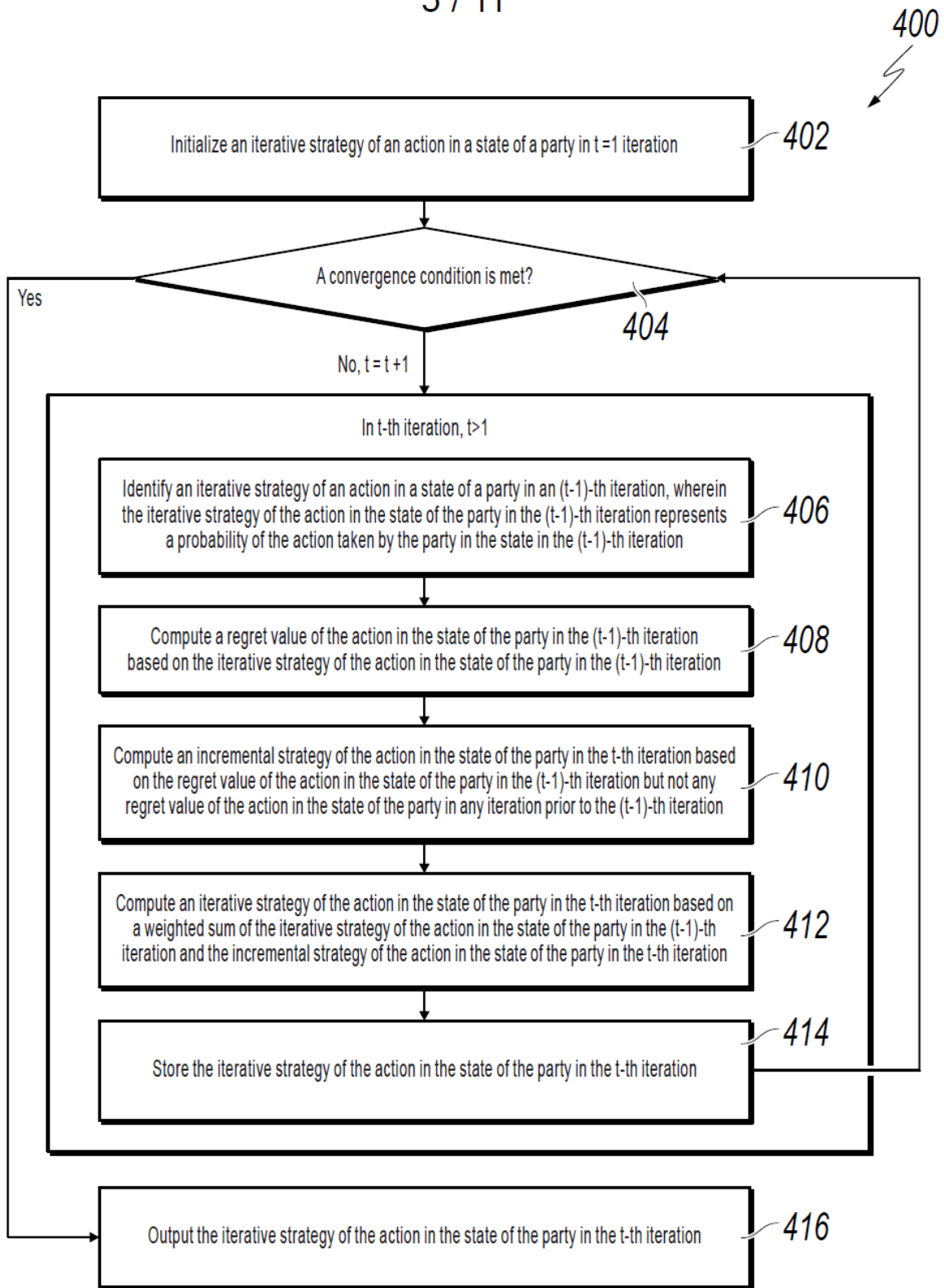
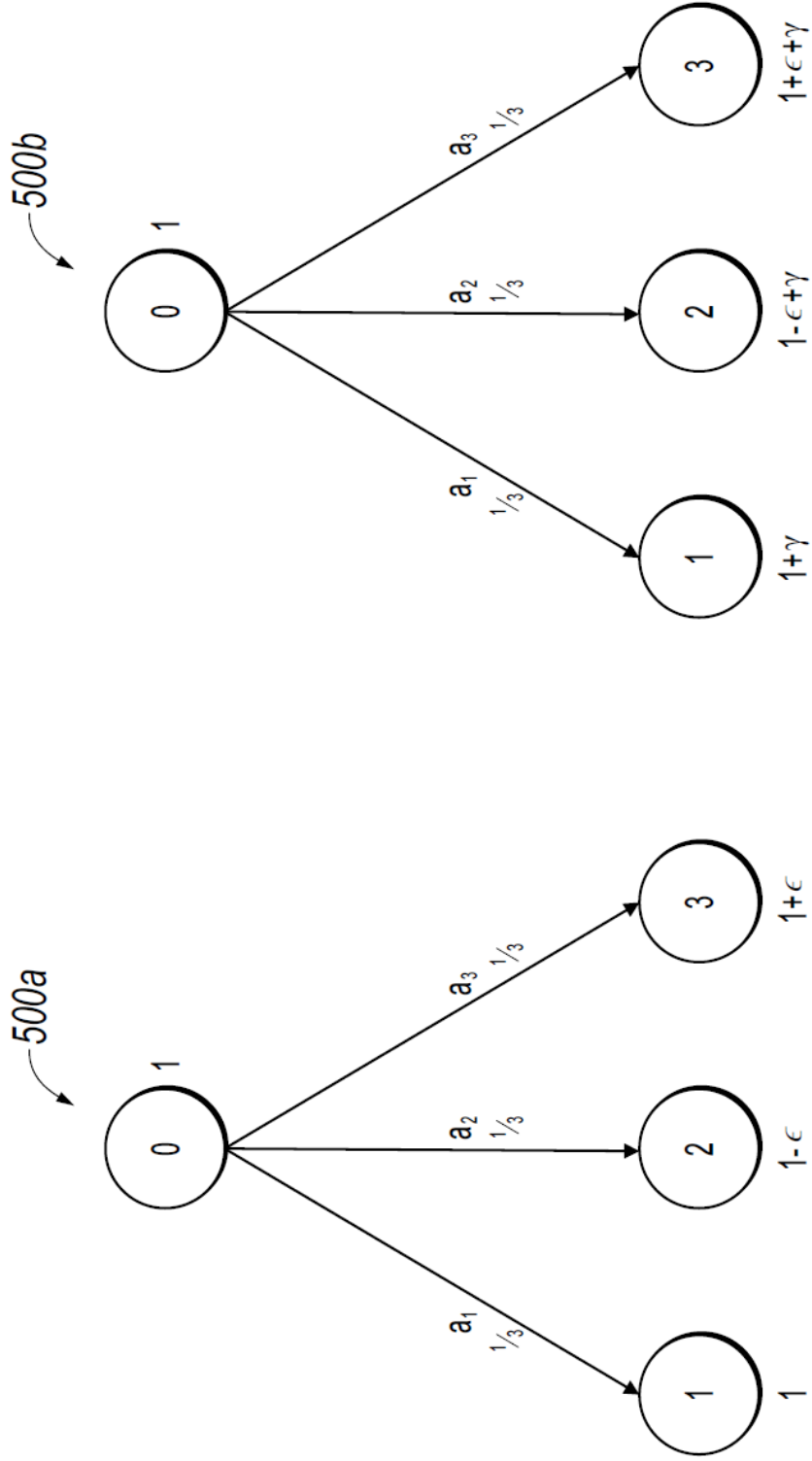


FIG. 4

**FIG. 5**

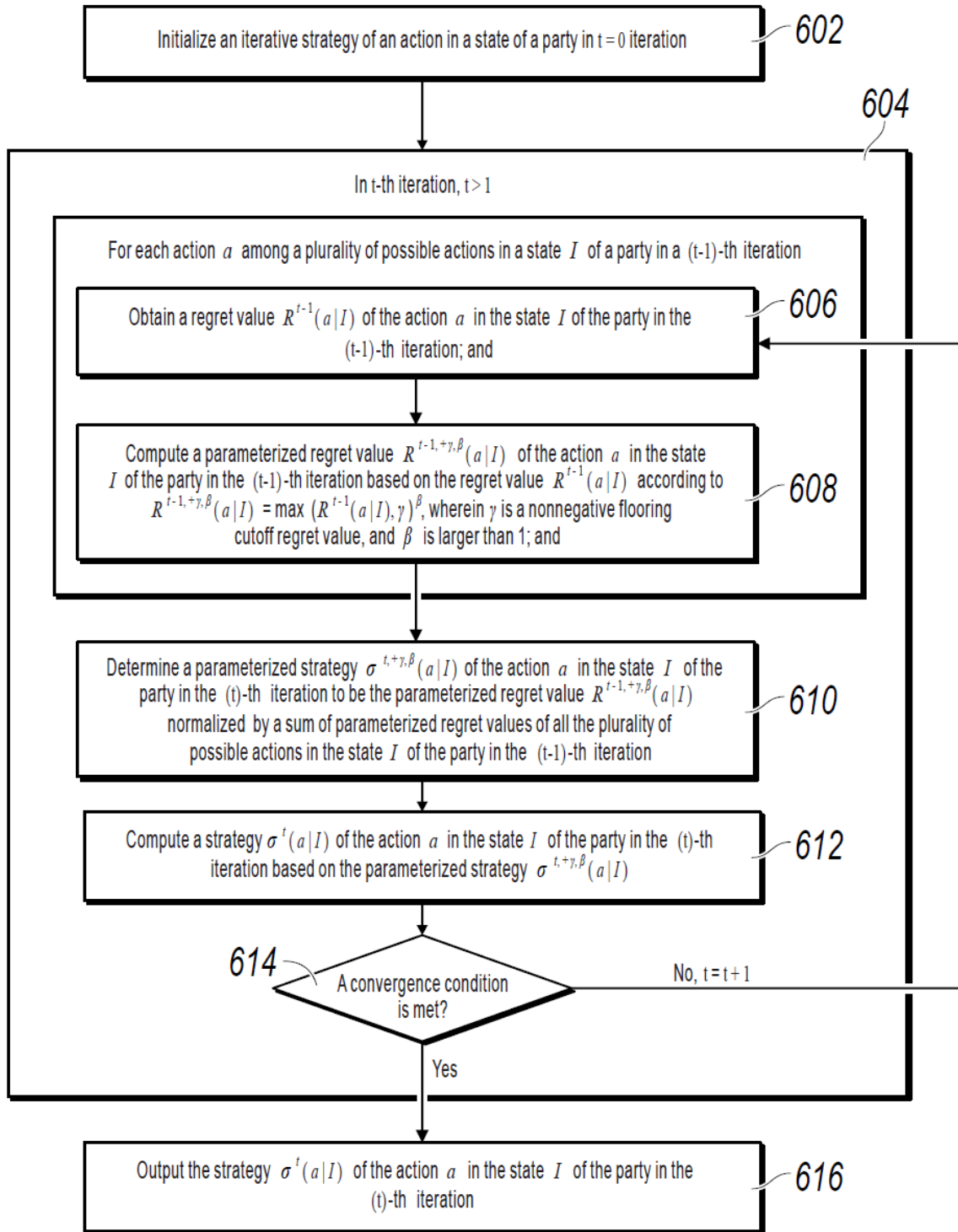
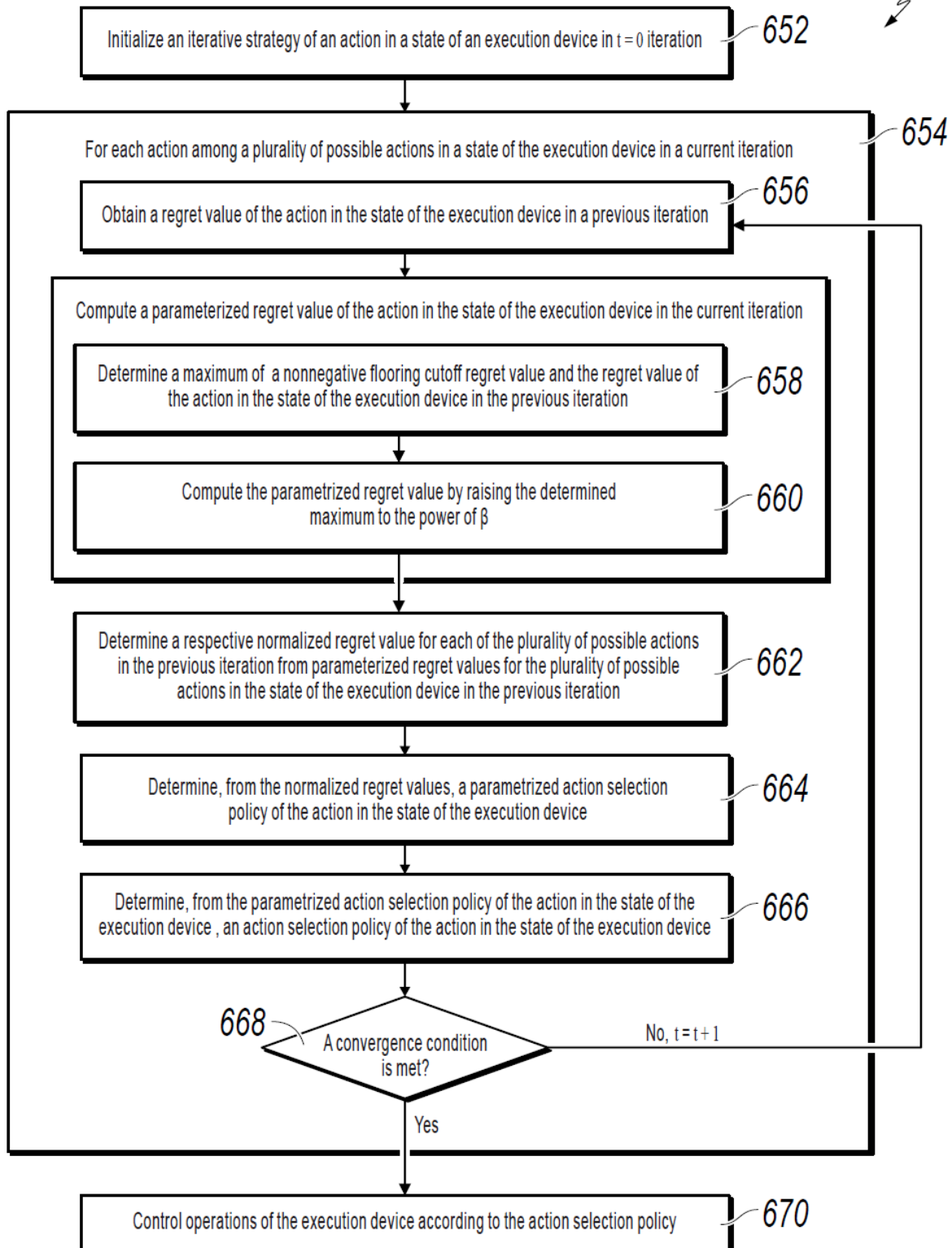
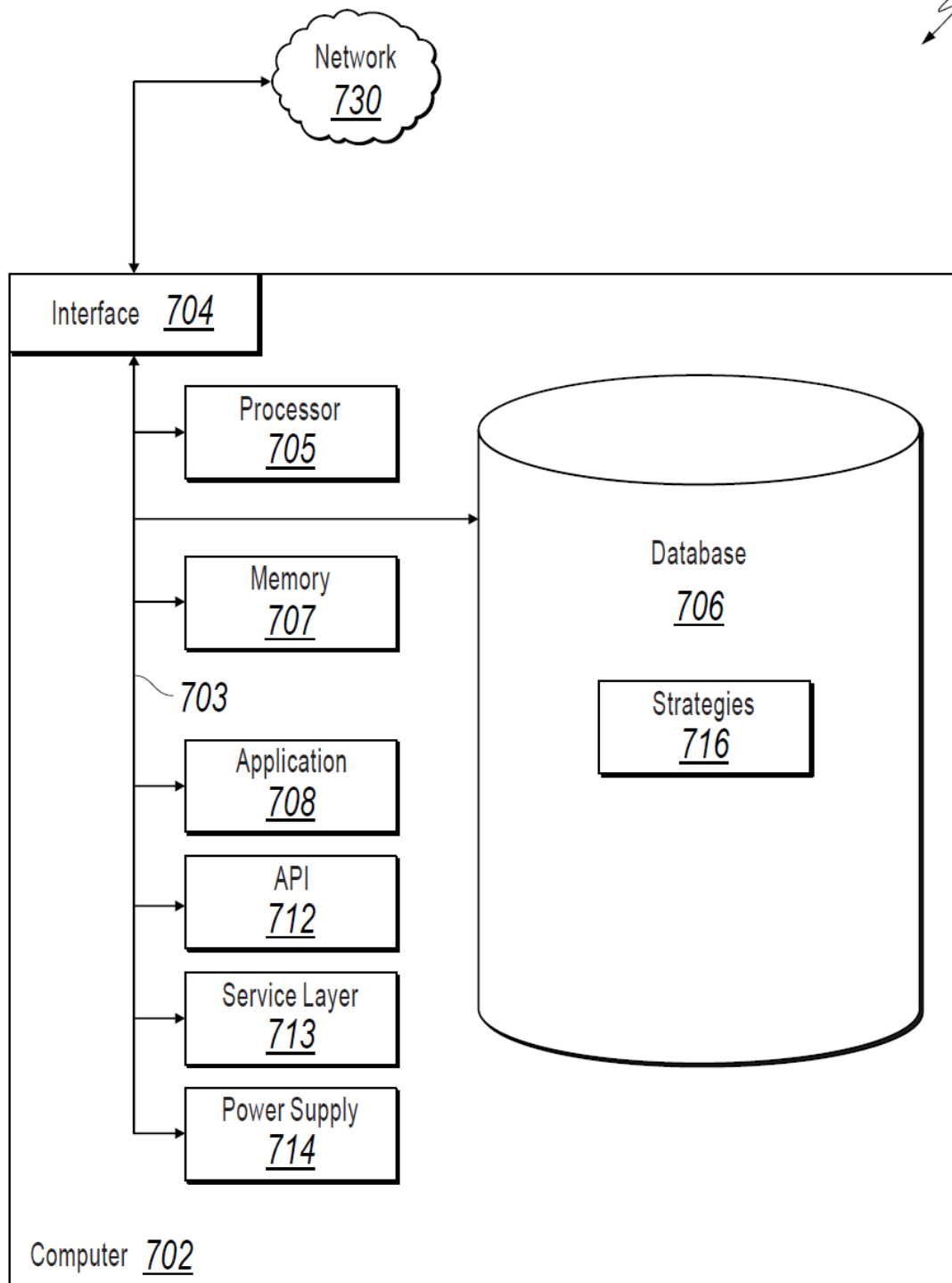
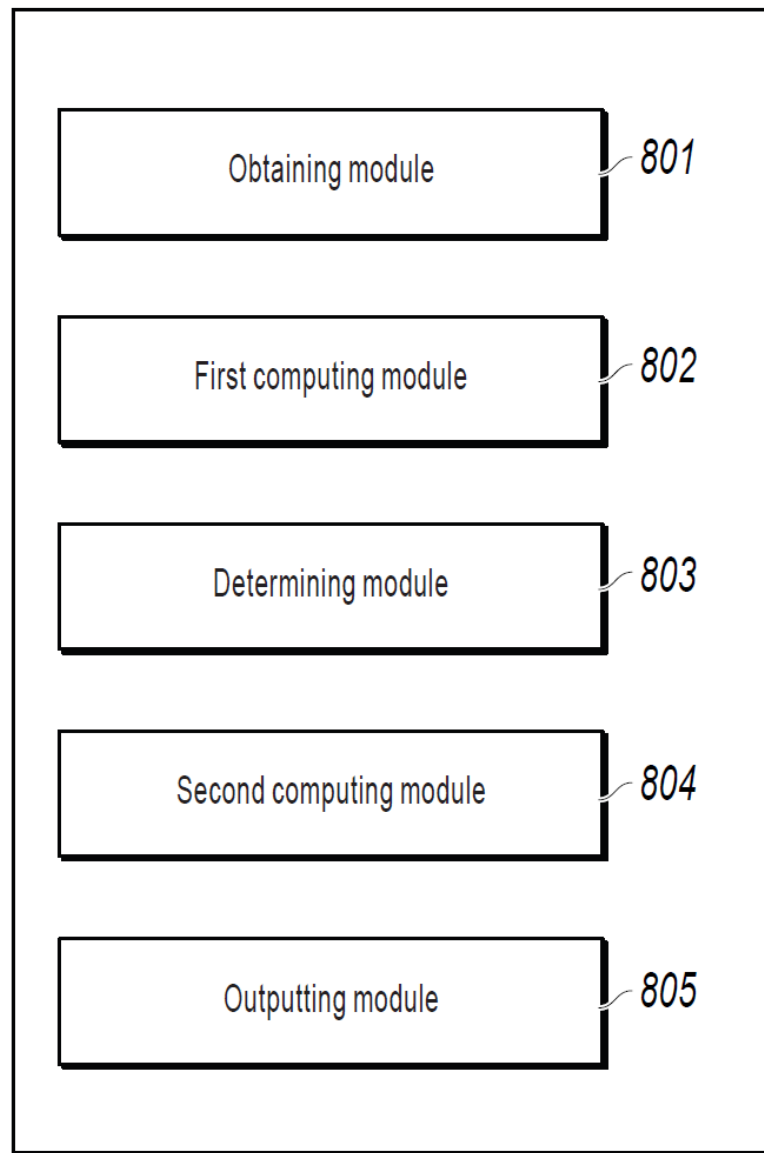


FIG. 6A

**FIG. 6B**

**FIG. 7**

**FIG. 8A**

800b
↙

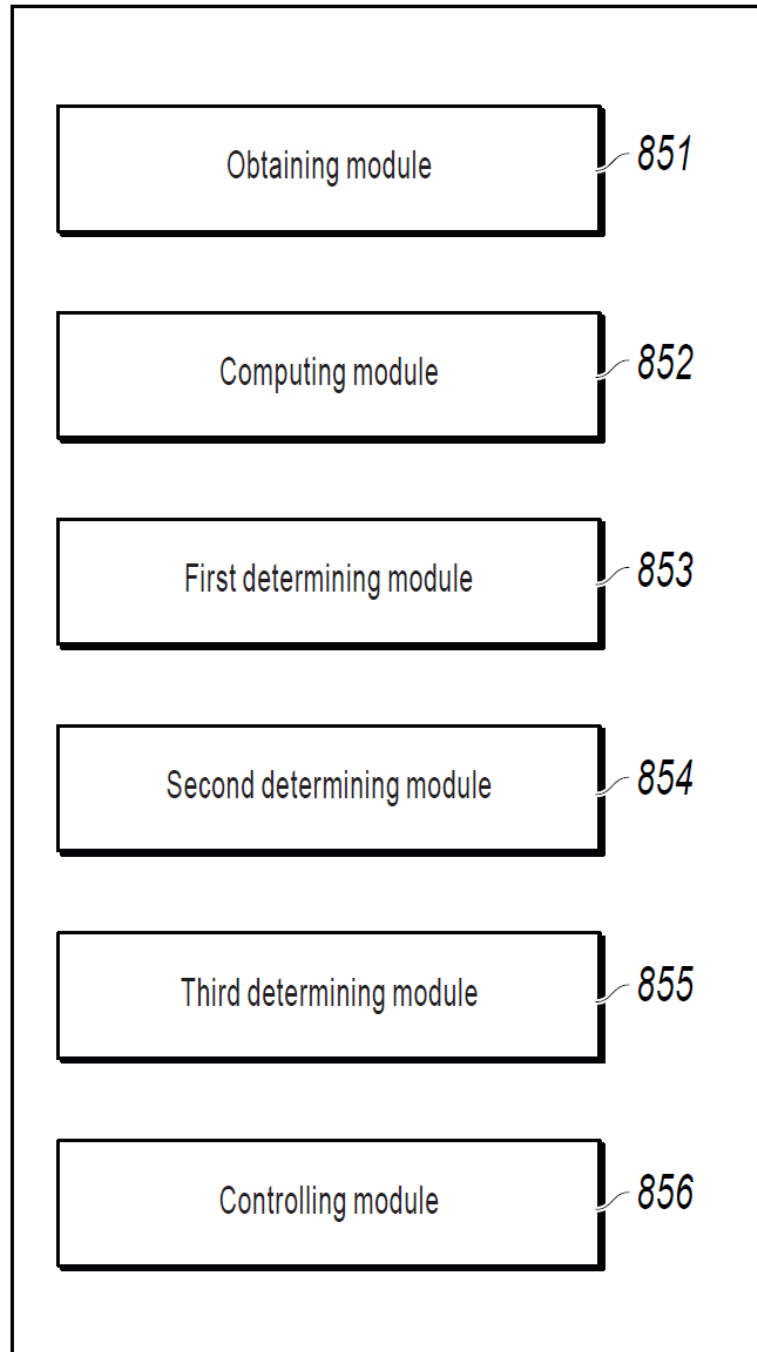


FIG. 8B