Verification mini-project

Crossing the River

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- Max 2 persons on the boat,

- Mom not alone with boys,

- Dad not alone with girls,

- Thief not alone with family,

- Only police officer, dad and mom can handle the boat.

```
1  clock time;
2
3  chan adultEmbark, childEmbark, disembark;
4
5  bool boatIsLeft = true;
6
7  bool policeIsLeft = true;
8  bool thiefIsLeft  = true;
9  bool dadIsLeft     = true;
10 bool momIsLeft     = true;
11 bool boy1IsLeft   = true;
12 bool boy2IsLeft   = true;
13 bool girl1IsLeft  = true;
14 bool girl2IsLeft  = true;
15
16
17 bool canInflictViolence() {
18     if (((momIsLeft == boy1IsLeft)
```
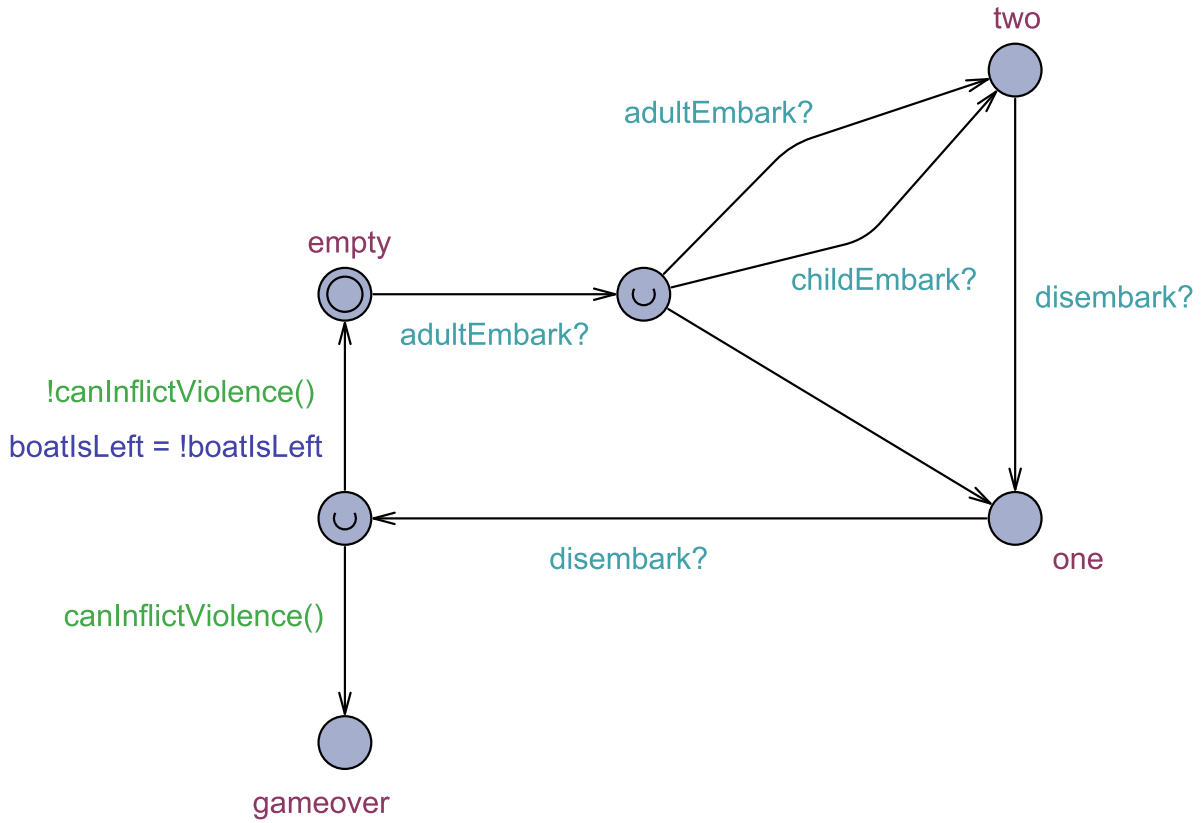
Figure 1: Boat.

```
19        || (momIsLeft == boy2IsLeft))
20       && (momIsLeft != dadIsLeft))
21         return true;
22
23    if (((dadIsLeft == girl1IsLeft)
24      || (dadIsLeft == girl2IsLeft))
25      && (dadIsLeft != momIsLeft))
26        return true;
27
28    if (((thiefIsLeft == boy1IsLeft)
29      || (thiefIsLeft == boy2IsLeft)
30      || (thiefIsLeft == girl1IsLeft)
31      || (thiefIsLeft == girl2IsLeft)
32      || (thiefIsLeft == dadIsLeft)
33      || (thiefIsLeft == momIsLeft))
34      && (thiefIsLeft != policeIsLeft))
35        return true;
36
37    return false;
38 }
```
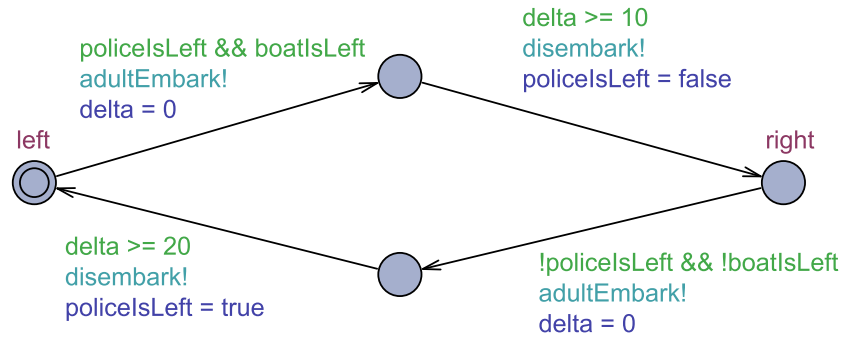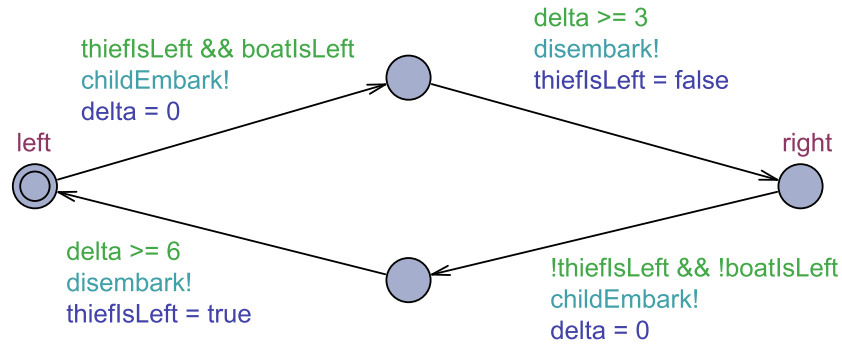
Figure 2: Police.

Figure 3: Thief.

Listing 1: Global declaration.

```
1 clock delta;
2
3 bool isLeft() {
4     if (isDad)
5         return dadIsLeft;
6     else
7         return momIsLeft;
8 }
9
10 void setLeft(bool left) {
11     if (isDad)
12         dadIsLeft = left;
13     else
14         momIsLeft = left;
15 }
```

Listing 2: Parent declaration.
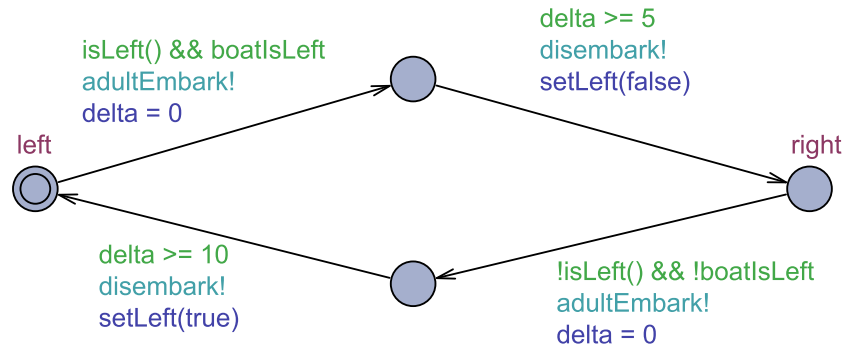
Figure 4: Parent.

```
1  clock delta;
2
3  bool isLeft() {
4      if (isBoy)
5          if (isFirst)
6              return boy1IsLeft;
7          else
8              return boy2IsLeft;
9      else
10         if (isFirst)
11             return girl1IsLeft;
12         else
13             return girl2IsLeft;
14 }
15
16 void setLeft(bool left) {
17     if (isBoy)
18         if (isFirst)
19             boy1IsLeft = left;
20         else
21             boy2IsLeft = left;
22     else
23         if (isFirst)
24             girl1IsLeft = left;
25         else
26             girl2IsLeft = left;
27 }
```

Listing 3: Child declaration.

```
1  clock time;
2
3  chan adultEmbark, childEmbark, disembark;
```
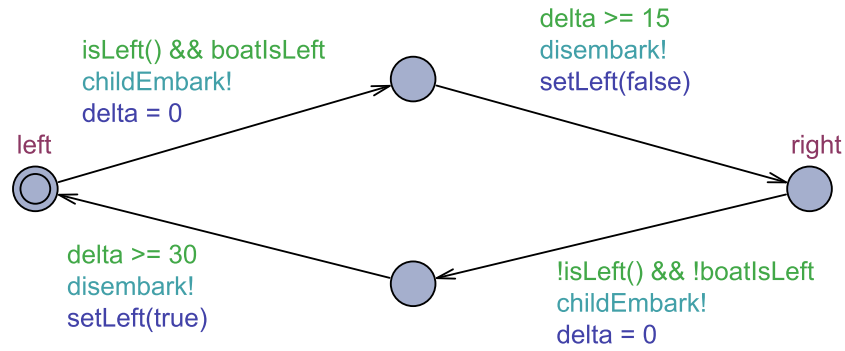
4

Figure 5: Child.

```
4
5  bool boatIsLeft = true;
6
7  bool policeIsLeft = true;
8  bool thiefIsLeft  = true;
9  bool dadIsLeft    = true;
10 bool momIsLeft    = true;
11 bool boy1IsLeft   = true;
12 bool boy2IsLeft   = true;
13 bool boy3IsLeft   = true;
14 bool girl1IsLeft  = true;
15 bool girl2IsLeft  = true;
16
17
18 bool canInflictViolence() {
19     if (((momIsLeft == boy1IsLeft) || (momIsLeft == boy2IsLeft) || (←
           momIsLeft == boy3IsLeft)) && (momIsLeft != dadIsLeft))
20         return true;
21
22     if (((dadIsLeft == girl1IsLeft) || (dadIsLeft == girl2IsLeft)) && (←
           dadIsLeft != momIsLeft))
23         return true;
24
25     if (((thiefIsLeft == boy1IsLeft) || (thiefIsLeft == boy2IsLeft) || (←
           thiefIsLeft == boy3IsLeft) ||
26          (thiefIsLeft == girl1IsLeft) || (thiefIsLeft == girl2IsLeft) ||
27          (thiefIsLeft == dadIsLeft) || (thiefIsLeft == momIsLeft)) &&
28          (thiefIsLeft != policeIsLeft))
29         return true;
30
31     return false;
32 }
```

Listing 4: Global declarations with an extra boy.