SoC V HW2 p7b

Arvind Singh Rathore
R10943157

Referring p6a,
We can buildBDD(o2,1) as:

```
BuildBDD(o2, 1)

BuildBDD(g9,1)
    A9 = BuildBDD(g8,1)
        WitnessBDD(g8,1)
            A8 = BuildBDD(g4,1)
                A4 = BuildBDD(c,1)
                B4 = BuildBDD(g1,1)
                    A1 = BuildBDD(b,1)
                    B1 = BuildBDD(d,1)
                    return BDDNode N = A1&B1
                return BDDNode N = A4&B4
            B8 = BuildBDD(g7,0)
                WitnessBDD(g7,0)
                    A7 = BuildBDD(g6,0)
                        A6 = BuildBDD(g2,0)
                            WitnessBDD(g2,0)
                                A2 = BuildBDD(e,0)
                                B2 = BuildBDD(~c,1)
                                restrict(A2,B2)
                        B6 = BuildBDD(d,0)
                        return BDDNode N = A6|B6
                    B7 = BuildBDD(g3,1)
                        A3 = BuildBDD(a,1)
                        B3 = BuildBDD(b,1)
                        return BDDNode N = A3&B3
                    restrict(A7,B7)
                restrict(A8,B8)
    B9 = BuildBdd(f,1)
    return BDDNode N = A9&B9
```

To produce the result, we can start from the innermost one, build A6, to the outermost one, build A9, and follow the procedure.

The orginal p6a has 10 BDD nodes.

After applying my restrict code, the number of nodes decreases from 10 to 5!

```
A6: Witness(g2,0)
[5](-) 0xf04a60 (3)
  [0](+) 0xf03310 (14)
  [0](-) 0xf03310 (14) (*)

==> Total #BddNodes : 2
A6 != 0 as above, return BDD.

A7 = A6 | (~d)
B7 = a & b

B8: Witness(g7,0)
[5](-) 0xf05b60 (2)
  [4](+) 0xf04a10 (3)
    [0](+) 0xf03310 (16)
    [0](-) 0xf03310 (16) (*)
  [0](-) 0xf03310 (16) (*)

==> Total #BddNodes : 3
B8 != 0 as above, return BDD.

B4 = b & d
A8 = c & B4

A9: Witness(g8,1)
[4](+) 0xf05c50 (2)
  [3](+) 0xf05c00 (1)
    [2](+) 0xf04970 (4)
      [0](+) 0xf03310 (18)
      [0](-) 0xf03310 (18) (*)
    [0](-) 0xf03310 (18) (*)
  [0](-) 0xf03310 (18) (*)

==> Total #BddNodes : 4
A9 != 0 as above, and we can get below result.

BDD of o2 equals 1
[6](+) 0xf05ca0 (1)
  [4](+) 0xf05c50 (3)
    [3](+) 0xf05c00 (1)
      [2](+) 0xf04970 (4)
        [0](+) 0xf03310 (19)
        [0](-) 0xf03310 (19) (*)
      [0](-) 0xf03310 (19) (*)
    [0](-) 0xf03310 (19) (*)
  [0](-) 0xf03310 (19) (*)

==> Total #BddNodes : 5
```