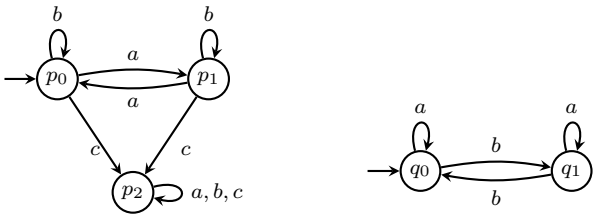
1. Consider the following functions `f()` and `g()`.

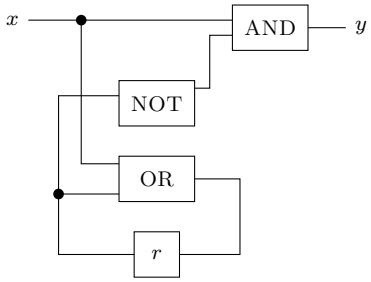
```
f(){                    g(){
  w = 5;                   z = w+1;
  w = 2*z + 2;             z = 3*z - w;
}                          print(z);
                         }
```

   We start with `w` and `z` set to `0` and execute `f()` and `g()` in parallel. What are the possible values printed by `g()`?

2. Given below are two transition systems which are executed in parallel. The two systems synchronize over shared actions $\{a, b\}$. Draw the transition system representing the joint behaviour of the concurrent system.



3. Consider the following sequential circuit: Use NuSMV tool to check if the above circuit satisfies the



   property: *in every execution, the register r becomes* 0 *at some point of time (excluding the initial value).*

4. Let ϕ be a property.
   (a) Can a transition system satisfy both ϕ and $\neg\phi$?
   (b) Is it possible that a transition system satisfies neither ϕ nor $\neg\phi$?

5. Which of the following are safety properties?

$$i)\ \boldsymbol{G}\, p \qquad ii)\ \boldsymbol{F}\, p \qquad iii)\ \boldsymbol{GF}\, p$$

   where p is an atomic proposition.