```
function [rewseen,stateseen] = eg_7_5_episode(n_rw_states)
% EG_7_5_EPISODE - simulate the states and rewards for a markov chain
% where with a fixed probability p we cycle back to our current state and
% with a fixed probability 1-p we transition to the state to the right of
% the current state.
%
% The reward is +1 on entering the rightmost terminal state.
%
% n_rw_states: the number of non-terminal states
%
% we return states in the range [1,n_rw_states+1].
%
% Written by:
% --
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%
% Please send comments and especially bug reports to the
% above email address.
%
%-----

% the probabiilty of a transition=p (q=probablity we stay in the same state):
p = 0.5; q = 1-p;
%p = 0.25; q = 1-p;
%p = 0.05; q = 1-p;

% start at the left most state:
st = 1; stateseen = [st]; rewseen = [];

while( st < (n_rw_states+1) )
  % go forward sometimes; stay at the same location otherwise:
  if( rand<p )
    stp1=st+1;
  else
    stp1=st;
  end

  % assign a reward for this step ... do the most common case first:
  if( (stp1~=(n_rw_states+1)) )
    rew = 0;
  else
    rew = +1;
  end

  % save everything:
  rewseen   = [rewseen, rew];
  stateseen = [stateseen, stp1];
  st = stp1;
end
```