Assignment 3.1

Submission Instructions

Read the questions carefully and create a PDF document with solutions. Put code and output in this document, wherever necessary for proper evaluation. Upload the final document on Moodle.

Question 1. In each case, give the computed output of the specified Lustre/ Heptagon Node

1. Please describe in English the output produced by the following Lustre V6 node.

```
node use_boolred(t: bool^5) returns (res: bool);
let
  res = boolred<<1,2,5>>(t);
tel
```

2. Please give and explain the output for the following heptagon node for the first 7 cycles in response to the input given below.

i	1	2	1	-1	3	0	-1
c	true	false	true	true	true	false	false

```
node even_times(i : int; c: bool) returns (o: int)
let
  automaton
    state EVEN
      do o = 100 -> i+1
      unless c continue ODD
    state ODD
      do o = 203 -> -2 * i
      unless c then EVEN
 end
tel
```

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Question 2. Study the following Lustre V6 code for nodes Foo and Bar.

```
node Foo(cin, x, y: bool) returns (cout, z: bool);
let
  z = cin xor x xor y;
  cout = if cin then x or y else x and y;
tel

node Bar(X: bool^8; Y: bool^8) returns (over: bool; Z: bool^8);
let
  (over, Z) = fillred<<Foo, 8>>(false, X, Y);
tel
```

Please compute the output for X=[0,1,1,0,1,1,1,0] and Y=[1,1,0,1,0,1,1,1] given at the 0^{th} cycle. Using this Bar node, define a counter which counts in binary modulo 64. (It should output binary numbers corresponding to the decimal numbers 0,1,2,...,63,0,1,2,....).