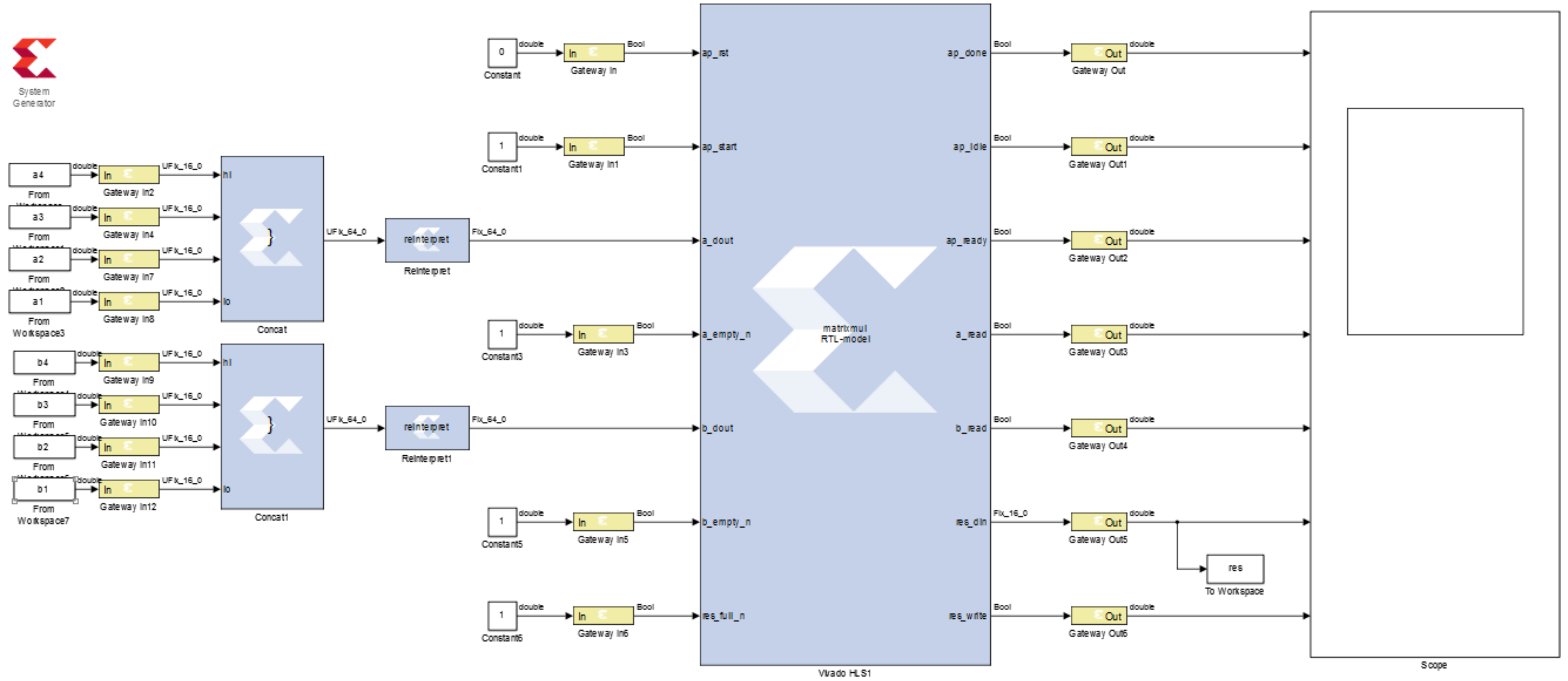
Optimizing the C code by reshaping the arrays and implementing the streaming FIFO interface such that one sample is read on every clock cycle requires some additional block in the system generator to be able to stream the input matrices to the exported Vivado HLS IP block.

Concat and reinterpret blocks could be used to insert the matrices generated in the workspace into the Vivado HLS block a and b inputs.



In addition, when generating the input matrices, a and b, in MATLAB workplace you should ensure that the loops iteration delays are considered. One idea could be using **zero padding** as in the code below.

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Generating first set of random matrices to be inserted to HLS block
a = randi([1 10],4);
b = randi([1 10],4);
a1_t = [zeros(2,1); a(1,1); zeros(3,1); a(2,1); zeros(3,1); a(3,1); zeros(3,1); a(4,1); zeros(9,1)];
a2_t = [zeros(2,1); a(1,2); zeros(3,1); a(2,2); zeros(3,1); a(3,2); zeros(3,1); a(4,2); zeros(9,1)];
```

```
a3_t = [zeros(2,1); a(1,3); zeros(3,1); a(2,3); zeros(3,1); a(3,3); zeros(3,1); a(4,3); zeros(9,1)];
a4_t = [zeros(2,1); a(1,4); zeros(3,1); a(2,4); zeros(3,1); a(3,4); zeros(3,1); a(4,4); zeros(9,1)];

b1_t = [zeros(2,1); b(1,1); b(1,2); b(1,3); b(1,4); zeros(18,1)];
b2_t = [zeros(2,1); b(2,1); b(2,2); b(2,3); b(2,4); zeros(18,1)];
b3_t = [zeros(2,1); b(3,1); b(3,2); b(3,3); b(3,4); zeros(18,1)];
b4_t = [zeros(2,1); b(4,1); b(4,2); b(4,3); b(4,4); zeros(18,1)];

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Constructing the inputs to be inserted to the HLS block
a1 = timeseries (a1_t);
a2 = timeseries (a2_t);
a3 = timeseries (a3_t);
a4 = timeseries (a4_t);
b1 = timeseries (b1_t);
b2 = timeseries (b2_t);
b3 = timeseries (b3_t);
b4 = timeseries (b4_t);
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Run the design
open_system('projct3.slx');
sim('projct3.slx');
```