Homework 3 Programming Assignment
Due: November 5, 2025

Instructions to be followed:
1. Please submit a soft copy your simulation code.
2. Simulator versions (Cygwin and Unix versions) are made available on Sharepoint. Install and test the simulator.

A. (10 Points) Test the mesh network.

Configuration file is *thead.h* -> Can setup 4 x 4, 8 x 8 mesh architectures with different VCs (2, 4). Check the number of bits for different node sizes (16 nodes requires 2^4 or 4 bits, 64 nodes requires 2^6 or 6 bits).

Use different options to run the simulator.
> ./mesh.exe 4 1 2 10000 0
4 -> packet size (number of flits per packet)
1 -> load size in fraction (0.1) or 10%
2 -> load size for the second decimal 12%
10000 -> number of simulation cycles
0 -> traffic, Uniform Random

Open *mesh.c* file to analyze the routing function, internal switch configuration, user send and receive processes and overall network design.
net.c is the network functions that are called to implement various packet events such as send packet, receive packet, etc. Most likely there is no need to modify for this assignment.
sim.h is the function that duplicates between simsys.h and sim.h and any function call in mesh should be declared in both sim.h and simsys.h files.
Simsys.h is the main header file for all structures that are declared.

B. (30 Points) Design a **N-node hypercube network**, where N = 2^k, k = 4,6,8,10. Use standard delays for routing, switching mentioned in thead.h; there is no need to change the configuration. Design the interconnect and routing of packets from source to destination.

C. (30 Points) Design a **N-node flattened butterfly topology** with N = 16, 64, 256 and 1024. Use standard delays for routing, switching mentioned in thead.h; there is no need to change the configuration. Design the interconnect and routing of packets from source to destination.

D. (*30 Points*) Compare the throughput and latency for different configurations with network load of 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0 for Uniform, Complement and Tornado traffic scenarios for packet size of 4 flits.