ML CHIP HW4

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Mapping:

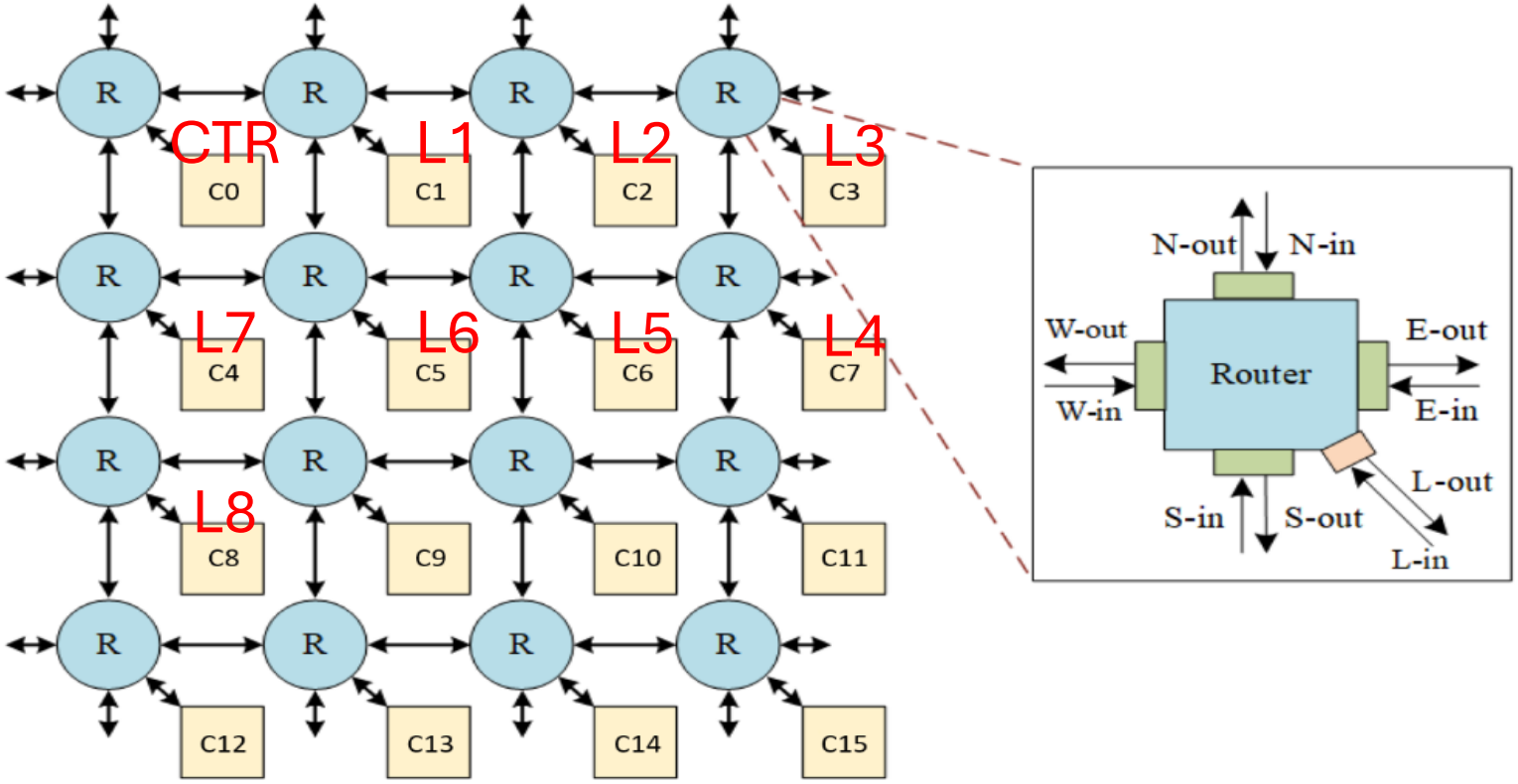
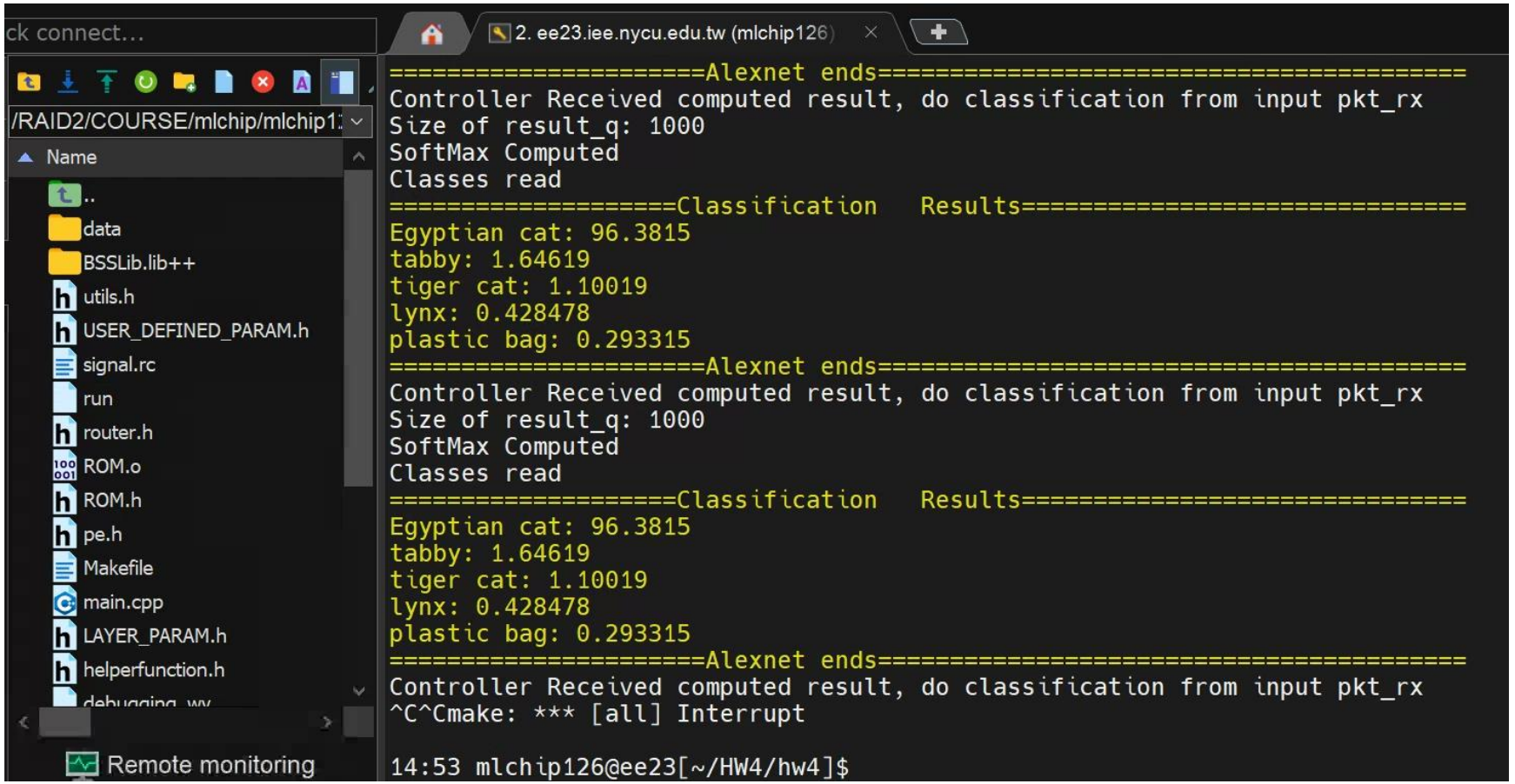


Figure1. 4x4 mesh-based NoC architecture

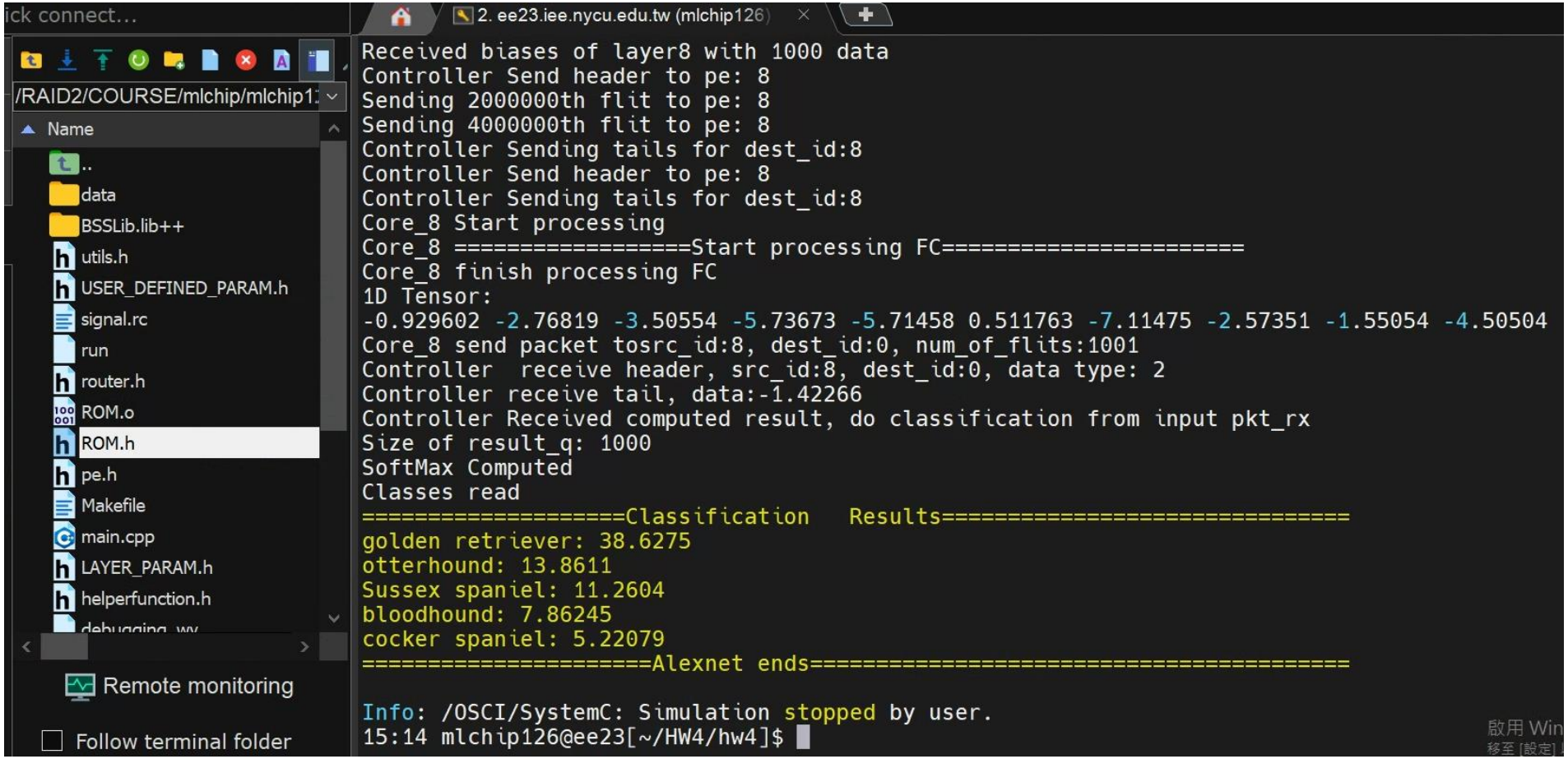
Task of each layer

CTR	SEND WEIGHTS,BIAS	WAIT L8 RESULT	Softmax	Classification
L1	Assymetric Padding	CONV	RELU	MP
L2	CONV	RELU	MP	
L3	CONV	RELU		
L4	CONV	RELU		
L5	CONV	RELU	MP	
L6	FC	RELU		
L7	FC	RELU		
L8	FC			

Result(cat):


ck connect...
2. ee23.iee.nycu.edu.tw (mlchip126)
/RAID2/COURSE/mlchip/mlchip1
Name
..
data
BSSLib.lib++
utils.h
USER_DEFINED_PARAM.h
signal.rc
run
router.h
ROM.o
ROM.h
pe.h
Makefile
main.cpp
LAYER_PARAM.h
helperfunction.h
Remote monitoring
==========Alexnet ends==========
Controller Received computed result, do classification from input pkt_rx
Size of result_q: 1000
SoftMax Computed
Classes read
==========Classification Results==========
Egyptian cat: 96.3815
tabby: 1.64619
tiger cat: 1.10019
lynx: 0.428478
plastic bag: 0.293315
==========Alexnet ends==========
Controller Received computed result, do classification from input pkt_rx
Size of result_q: 1000
SoftMax Computed
Classes read
==========Classification Results==========
Egyptian cat: 96.3815
tabby: 1.64619
tiger cat: 1.10019
lynx: 0.428478
plastic bag: 0.293315
==========Alexnet ends==========
Controller Received computed result, do classification from input pkt_rx
^C^Cmake: *** [all] Interrupt
14:53 mlchip126@ee23[~/HW4/hw4]$

Result(dog):


ick connect...
2. ee23.iee.nycu.edu.tw (mlchip126)
/RAID2/COURSE/mlchip/mlchip1
Name
..
data
BSSLib.lib++
utils.h
USER_DEFINED_PARAM.h
signal.rc
run
router.h
ROM.o
ROM.h
pe.h
Makefile
main.cpp
LAYER_PARAM.h
helperfunction.h
Remote monitoring
Follow terminal folder
Received biases of layer8 with 1000 data
Controller Send header to pe: 8
Sending 2000000th flit to pe: 8
Sending 4000000th flit to pe: 8
Controller Sending tails for dest_id:8
Controller Send header to pe: 8
Controller Sending tails for dest_id:8
Core_8 Start processing
Core_8 ==================Start processing FC======================
Core_8 finish processing FC
1D Tensor:
-0.929602 -2.76819 -3.50554 -5.73673 -5.71458 0.511763 -7.11475 -2.57351 -1.55054 -4.50504
Core_8 send packet tosrc_id:8, dest_id:0, num_of_flits:1001
Controller receive header, src_id:8, dest_id:0, data type: 2
Controller receive tail, data:-1.42266
Controller Received computed result, do classification from input pkt_rx
Size of result_q: 1000
SoftMax Computed
Classes read
====================Classification   Results==============================
golden retriever: 38.6275
otterhound: 13.8611
Sussex spaniel: 11.2604
bloodhound: 7.86245
cocker spaniel: 5.22079
======================Alexnet ends=======================================
Info: /OSCI/SystemC: Simulation stopped by user.
15:14 mlchip126@ee23[~/HW4/hw4]$

Simulation Specification:

- Routing algorithm: X-Y
- Scheme: Wormhole
- Implementation: Algorithmic
- Input buffer size: 1 flit
- Flow control:ACK-NACK
- Virtual Channel: Not used
- # of PE Used: 9, 1 for controller 8 for layers

Operations:

- Sends weights and biases to each need Pes then send input feature to the pe of first layer, after first layer finishes its calculation, send out the result of first layer to second layer, vice versa. Controller at the same time waits for the result of the last layer(PE8) which is the result of the fully connected layer8.

Remark:

- Requires tons of time to send the weights and biases, especially weights for fully connected layer. 9216x4096 datas needed to be sent from Controller to PE.
- To speedup the simulation process, waveform generation should be turned off, release the unneeded tensor memory also adding flags -03 to the C++ compiler directive in the Makefile is also useful.

```
all:
	g++ -O3 -I . -I $(INC_DIR) -L . -L $(LIB_DIR) -o $(O) $(C) $(LIB) $(RPATH)
	./run
```

- Spyder IDE with Python code of AlexNet can aids the debugging process for each layer result