Lab Assignment 4

Name - Md Junaid Mahmood

Enrolment Number - 19116040

Department – Computer Science & Engineering

Year - 2nd Year

Lesson 1: Seeing the impact of strided access

(i) K = 1

#Hits = 24

#Misses = 8

(ii) K = 2

#Hits = 16

#Misses = 16

(iii) K = 4

#Hits = 0

#Misses = 32

Lesson 2: Seeing the impact of loop interchange

(iv) For Code 2

#Hits = 24

#Misses = 8

(v) For Code 3

#Hits = 0

#Misses = 32

Lesson 3: Seeing the miss-rate of matrix transpose operation

(vi) For Code 4

#Hits = 48

#Misses = 80

For ld instructions:

#Hits = 0

#Misses = 64

For st instructions:

#Hits = 48

#Misses = 16

(vii) For Code 5

#Hits = 48

#Misses = 80

For ld instructions:

#Hits = 48

#Misses = 16

For st instructions:

#Hits = 0

#Misses = 64

Lesson 4: Seeing the impact of approximation (precision-scaling)

(viii) Make a table

Binary Number	**Decimal**	**Diff**
01001011100100011101100000000100	19116040	0
01001011100100011101100000000000	19116032	-8
01001011100100011101100000000000	19116032	-8
01001011100100011101000000000000	19111936	-4104
01001011100100010000000000000000	19005440	-110600
01001011100100000000000000000000	18874368	-241672
01001011000000000000000000000000	8388608	-10727432

Comments:

- Here decimal number is the corresponding number in the *Value actually stored in float* term.
- Diff = New Decimal Number – Original Decimal Number
- Original Decimal Number = 19116040 (It was the *value actually stored in float* for the number 19116040.34567)

Lesson 5: Seeing the impact of error in bits of different importance

(ix) Make a table

Error in Bit	Representation	Decimal Number	Diff
No Error	01001011100100011101100000000100	19116040	0
1	00001011100100011101100000000100	5.617699257523220223457 67E-32	-19116039.99999
2	01101011100100011101100000000100	35262869758279473707352 0640	3.52628697582E26
3	01011011100100011101100000000100	82102766629027840	8.21027666099E16
4	01000011100100011101100000000100	291.6876220703125	-19115748.31237
5	01001111100100011101100000000100	4893706240	4874590200
6	01001001100100011101100000000100	1194752.5	-17921287.5
7	01001010100100011101100000000100	4779010	-14337030
8	01001011000100011101100000000100	9558020	-9558020
9	01001011110100011101100000000100	27504648	8388608

Comments:

- Here E represents 10 to the power of some number. For instance, E5 represents 10^5.
- Decimal Number has been written using the *Value actually stored in float* term.
- For Error in bit = 1, approximate value of the Decimal Number is mentioned as it contained many insignificant digits after decimal.
- Formulae for Diff = New Decimal Number - Original Decimal Number, where Original Decimal Number = 19116040 (It was the *value actually stored in float* for the number 19116040.34567).

Lesson 6: Seeing the impact of memory technology on important metrics

(x) Run destiny with four cfg files and show the write latency and leakage power in the table

Memory	Write Latency(ns)	Leakage Power(mw)
SRAM	0.870329	82.2568
eDRAM	0.426995	12.0617
STTRAM	4.69172	37.3457
ReRAM	8.71368	101.578