# Lab 03 – Worksheet

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| **Note:** Assumptions and logics should be explained separately in tasks after the task results. |

## Task 1a.

*Provide appropriately commented codes (Mention question part before each part)*

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| Listing 3:  # assuming that variables f to j are in registers x19-x23  bne x22, x23, Else # checking if the values in x22 and x23 are not equal  add x19, x20, x21 # adding the values in x20 and x21 and storing it in x19  beq x0, x0, Exit # un conditional jump (checking if the values are equal)  Else: sub x19, x20, x21 # subtracting the values in x20 and x21 and storing it in x19  Exit: # the code after if/else goes here  For bne:  Imm: 000101111011  Rs2: 00010  Rs1: 110  Func3: 011  Imm: 00011  Op code: 11000111  Joining these:  000101111011 00010 110 011 00011  Converting 0x017b1663 to binary:  000101111011 00010 110 011 00011  For beq:  Imm: 000000000000  Rs2: 00000  Rs1: 000  Func3: 000  Imm: 01000  Op code: 11000111  Joining these:  000000000000 00000 000 000 01000 11000111  Converting 463 to binary:  000000000000 00000 000 000 01000 11000111  Listing 4:  # assuming i and k in x22 and x24, and the base address of Save in x25  Loop: slli x10, x22, 2 # Temp reg x10 = i \* 4  add x10, x10, x25 # x10 = address of save[i]  lw x9, 0(x10) # Temp reg x9 = save[i]  bne x9, x24, Exit # go to Exit if save[i] != k  addi x22, x22, 1 # i = i + 1  beq x0, x0, Loop # go to Loop  Exit: |

*Add screenshot of your results (register)*

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| *Case 1: Not equal (subtraction)* |
| *Case 2: equal (addition)*  *Listing 4:* |

## Task 1b.

*Provide appropriately commented codes (Mention question part before each part)*

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| addi, x24, x0, 1 # case 1  addi, x25, x0, 2 # case 2  addi, x26, x0, 3 # case 3  addi, x27, x0, 4 # case 4  add, x28, x0, x19 # choosing cases  add, x29, x0, x17 # inputing b  add, x31, x0, x18 # inputing c  addi x2, x0, 2 # adding 2 to be used in case 3 and 4  addi x30, x0, 0 # for default value  beq x28, x24, Case1 # if equal, it jumps to case 1  beq x28, x25, Case2 # if equal, it jumps to case 2  beq x28, x26, Case3 # if equal, it jumps to case 3  beq x28, x27, Case4 # if equal, it jumps to case 4  Case1:  add x30, x17, x18 # adding the value in x17 and x18 and storing it in x30  beq x0, x0, Exit # Case ended  Case2:  sub x30, x17, x18 # subtracting the value in x17 and x18 and storing it in x30  beq x0, x0, Exit # Case ended  Case3:  mul x30, x17, x2 # multiplying the value in x17 by 2 and storing it in x30  beq x0, x0, Exit # Case ended  Case4:  div x30, x17, x2 # dividing the value in x17 by 2 and storing it in x30  beq x0, x0, Exit # Case ended  Exit: |

*Add screenshot of your results (register)*

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| *Case 1 (Addition):*    *Case 2 (Subtraction):*      *Case 3 (Multiplication):*    *Case 4 (Division):* |

## Task 1c Provide appropriately commented codes (Mention question part before each part)

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| addi x22, x0, 0 #variable i in x22  li x4, 0x200 # loading base address of array in x4  addi x9, x0, 9 # saving constant value 9  loop: slli x11, x22, 2 # i \* 4 by moving i two units left  add x11, x11, x4  sw x22, 0(x11)  beq x22, x9, exit # if i has run 10 iterations, we jump to exit  addi x22, x22, 1 # i = i + 1  beq x0, x0, loop # jumping back to loop  exit:  addi x22, x0, 0 # pushing i in x22  addi x23, x0, 0 # pushing sum in x23  li x4, 0x200  loop2: slli x11, x22, 2 # i \* 4 by moving two units left  add x11, x11, x4  lw x2, 0(x11)  add x23, x23, x2  beq x22, x9, exit2 # loop ends after 10 iterations  addi x22, x22, 1  beq x0, x0, loop2  exit2: |

*Add screenshots of your results (register & memory both)*

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**Task 1d (Challenge)**

*Provide appropriately commented codes (Mention question part before each part)*

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*Add screenshots of your results (register & memory both)*

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# Lab 03

# Assessment Rubrics

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| **Task No.** | **LR 2**  **Code** | **LR 5**  **Results** | **AR 7**  **Report Submission/Code Comments** |
| **Task 1a** | /10 | /10 | /30 |
| **Task 1b** | /10 | /10 |
| **Task 2a** | /15 | /15 |
| **Task 2b** |  |  |
| **Total Points** |  | /100 Points |  |
| **CLO Mapped** |  | CLO 2 |  |

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| **#** | **Assessment Elements** | **Level 1: Unsatisfactory** | **Level 2: Developing** | **Level 3: Good** | **Level 4: Exemplary** |
| **LR2** | **Program/Co de/ Simulation Model/ Network Model** | Program/code/simulation model/network model does not implement the required functionality and has several errors. The student is not able to utilize even the basic tools of the software. | Program/code/simulation model/network model has some errors and does not produce completely accurate results. Student has limited command on the basic tools of the software. | Program/code/simulation model/network model gives correct output but not efficiently implemented or implemented by computationally complex routine. | Program/code/simulation  /network model is efficiently implemented and gives correct output. Student has full command on the basic tools of the software. |
| **LR5** | **Results & Plots** | Figures/ graphs / tables are not developed or are poorly constructed with erroneous results. Titles, captions, units are not mentioned.  Data is presented in an obscure manner. | Figures, graphs and tables are drawn but contain errors. Titles, captions, units are not accurate. Data presentation is not too clear. | All figures, graphs, tables are correctly drawn but contain minor errors or some of the details are missing. | Figures / graphs / tables are correctly drawn and appropriate titles/captions and proper units are mentioned. Data presentation is systematic. |
| **AR9** | **Report Content/Code Comments** | No summary provided. The number/amount of tasks completed below the level of satisfaction and/or submitted late | Couldn’t provide good summary of in-lab tasks. Some major tasks were completed but not explained well.  Submission on time. Some major plots and figures provided | Good summary of In-lab tasks. All major tasks completed except few minor ones. The work is supported by some decent explanations, Submission on time, All necessary plots, and figures provided | Outstanding Summary of In-Lab tasks. All task completed and explained well, submitted on time, good presentation of plots and figure with proper label, titles and captions |