....

(Load/Store), { Arrays } in MIPS Assembly

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1. (20 pts) **Sum of three integers stored in the memory** (like in the notes ...)

   (a) Specify memory location using: [`la`]
   (b) Load immediate integer-1 to register: [`$t1`]
   (c) Load immediate integer-2 to register: [`$t2`]
   (d) Load Immediate integer-3 to register: [`$t3`]
   (e) Store integer–1 to Memory
   (f) Store integer–2 to Memory
   (g) Store integer–3 to Memory
   (h) Load integer–1 from memory to Register: [`$t4`]
   (i) Load integer–2 from memory to Register: [`$t5`]
   (j) Load integer–3 from memory to Register: [`$t6`]
   (k) `add`: integer-1 + integer-2 + integer-3: [`$t7`]
   (l) Store the result of the addition again to memory
   (m) Load the result of the addition to register: [`$t8`]....(DONE)

   - **At the end of the problem clearly state the result (decimal)**
   - **In the report include a screen–shot of the register (Registers–area) with the result (decimal).**

2. (20 pts) **Vector (array) addition**

   Create, in the memory, the following 2–integer arrays (vectors): $Array(A)$, $Array(B)$.

   $$Array(A) = \begin{bmatrix} 1 \\ 2 \end{bmatrix}, \quad Array(B) = \begin{bmatrix} 3 \\ 4 \end{bmatrix}$$

   (a) Add the 2 created arrays (vectors): $Array(A) + Array(B) = Array(C)$.
   (b) Print (console) the elements of the resulting vector $[Array(C)]$.

   - **At the end of the problem clearly state the result (decimal)**
   - **In the report include a screen–shot of the console with the result (decimal).**

3. (20 pts) Using MIPS Assembly evaluate the determinant of the **"X"** matrix:

   $$|\mathbf{X}| = \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$$

(a) **Initially MUST load** in the memory all the 4 matrix coefficients (3, 2), (1, 4) ...

(b) Place the result **ONLY** into register: [$t1], and the console.

- **At the end of the problem clearly state the result (decimal)**
- **In the report include screen–shots of the register (Registers–area) and the console, with the result.**

4. (20 pts) Using MIPS Assembly evaluate the matrix operation (**"Y"**):

$$\mathbf{Y} = \begin{bmatrix} 7 & 6 \\ 8 & 9 \end{bmatrix} \times \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$$

(a) **Initially MUST load** in the memory all the 2 matrix coefficients arrays (7, 6, 8, 9) and (3, 2, 1, 4) ...

(b) Place the result **ONLY** into registers: [$t1, $t2, $t3, $t4].

- **At the end of the problem clearly state the result (decimal)**
- **In the report include screen–shots of the register (Registers–area) and the console, with the result.**

5. (20 pts) Using MIPS Assembly evaluate the matrix operation (**"Z"**):

$$\mathbf{Z} = \begin{bmatrix} 7 & 6 \\ 8 & 9 \end{bmatrix} + \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$$

(a) **Initially MUST load** in the memory all the 2 matrix coefficients arrays (7, 6, 8, 9) and (3, 2, 1, 4) ...

(b) Place the result **ONLY** into registers: [$t1, $t2, $t3, $t4].

- **At the end of the problem clearly state the result (decimal)**
- **In the report include screen–shots of the register (Registers–area) and the console, with the result.**

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Matrix addition:        https://en.wikipedia.org/wiki/Matrix_addition
Matrix multiplication: https://en.wikipedia.org/wiki/Matrix_multiplication
Matrix determinant:     https://en.wikipedia.org/wiki/Determinant
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- Prepare a report (PDF) taking in to account the following guidelines.

  1. Present the problem and the Assembly–Code

     (a) The programs should be simple and well– documented
     (b) The programs should be modularized
     (c) Detailed comments are necessary

  2. In the report include a partial screenshot of the register (Register File) with the result.

  3. Indicate if the program runs successfully according to specifications

  4. Discuss the result and clearly state the result in decimal.

- How can I submit my software assignment?

  The homework–report should **ALL** be written ... using only a word processor (Microsoft WORD, ..., or TEX/LATEX). Absolutely no handwriting/handgraphing and photographing. Writing the report follow the sample homework given in CANVAS (Files).

  ... Upload the report in PDF to CANVAS

- Grading:

Documentation	Excellent (3)	Average (2)	Low (1)
Functionality	Compiles fine (7)	Compiles warnings (4)	Does not Compile (2)
Delivery	On–time (%100)	Next–Day (50%)	After two days (%20)