Lab 1 Cover Page

1. Project Description: This was project was preformed to learn how to install and use mars software. The objective was to install the software then program a MIPS processor using assembly in the mars IDE. For this we have to understand how the assembly langue works for MIPS processor.

2. Solutions to problems and assembly language basics:

* 1. For a color display using 8 bits for each of the primary colors (red, green, blue) per pixel, what should be the minimum size in bytes of the frame buffer to store a frame?
     1. 320x240x3 = width\*height\*number of colors = 230,400 bytes
     2. 720\*360\*3 = width\*height\*number of colors = 777,600 bytes
  2. If all overheads are ignored, what is the longest video that this prototype SAMSUNG could store?
     1. 32GB = 16\*s \* 128KB 2^35 = 2^4\*s \* 2^17 s=2^14 seconds
  3. What is the sufficient capacity for the DLU to record 4 days’ worth of data?
     1. 5(processors)\*64KB \*60(seconds)\*60(minutes)\*24(hours)\*4(days) = 1.12\*10^11 bytes
  4. How much storage is required to handle backing up UCF’s data every 2 years?
     1. 2(years)\*4(times per year)\*32TB(storage per node)\*256(nodes per server)\*128(severs)\*6(warehouses) = 3\*2^64 bytes
  5. Slides summary
     1. Program execution on hardware works by cpu sending the memory an address. From here the cpu can send data if it wants to write to a block of memory or have the memory return data if the cpu wants to read data. In assembly to sum two numbers it takes four lines of code, where in C it only takes one line of code. The blocks of memory are stored in bits.
  6. Assembly Coding Basics
     1. In assembly when working with text we need .data to define we are using data, .asciiz to say what type how string out text is in, .text to indicate that this is a text string. Li $v0 4 says that we want to print a string. La $a0 says what string we want to print out. Syscall runs these steps. Li $v0 10 says that we want to exit this program then run a syscall again to excute this command.

3. Topics covered in this lab

A) How to write a program in assembly.

B) How data transfer works between the cpu and ram. The cpu sends an address and command whether to read or write. For read the memory sends the data back to the cpu, for write the memory stores the data at that address.

C) That higher level languages compile into lower level languages. C compiles to assembly, which compiles into machine code, in binary that a machine can understand and preform a task.

D) That for every line of c code, it takes about 7 lines of assembly to perform the same task. It is much easier for an employee to write in c code but, the processor with work more efficiently with assembly because it will not have to compile the c code.

E) That MARS is an IDE that can be used to write assembly code for the MIPs processor. An IDE can compile code, and in this instance it is used to compile assembly to machine language for MIPS.

4. C-Code

#include<stdio.h>

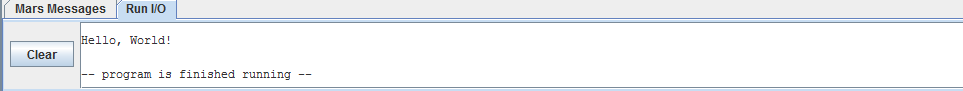
int main() {

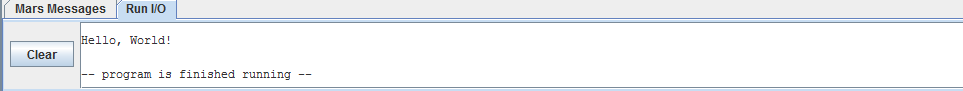
Printf(“Hello World”);

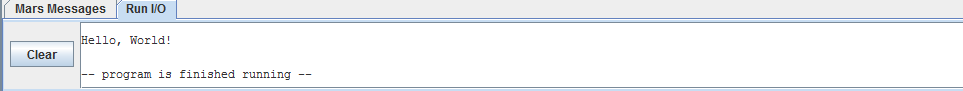
Return 0;

}

5. The inputs given for this file were the string hello world. This input was used because this is the first program written in assembly and it is standard that the first program written in a language no yet known will be hello world.







6. References

A) Portfolio pdf: This is used for the questions, instructions on how to install mars, and sample code for the hello world program.

B) Project Slides: This is used to answer the technical questions about of processor and memory interact and how c and assembly language differ.

C) Grading Rubric: This is used to help with the formatting of the lab report and the questions associated with the lab report.