DT081 Year 4 COMPUTER ARCHITECTURE 3

Lab 5 (Part 1)
Building and executing C programs on MIPS simulator

Task

1. Start MipsIt and create a new C(minimal)/Assembler project.
2. Write a C Program as follow:

```
main()
{
        int x,y,z;
        x = 9;
        y = 8;
        z = x+y;
}
```

3. Build the executable and upload to the Mips simulator.
4. View the assembly version of the C program.
5. Identify the core assembly instructions in the RAM of the simulator that are the compiled version of your C program.
6. What is the rest of the code doing there?
7. Set a breakpoint at the beginning of this block of code.
8. Run the program up to the breakpoint.
9. Single step through your section of code and confirm that it produces the correct result.

Dr. R. Lynch

Memory

Address	Content	Label		
8001FFFC	00 00 00 00		NOP	
80020000	27 BD FF D8	main()	ADDIU	$29, $29, 0xffd8
80020004	AF BF 00 24		SW	$31, 0x24($29)
80020008	AF BE 00 20		SW	$30, 0x20($29)
8002000C	0C 00 80 B9		JAL	0x80b9
80020010	03 A0 F0 21		ADDU	$30, $29, $00
80020014	24 02 00 09		ADDIU	$02, $00, 0x9
80020018	AF C2 00 10		SW	$02, 0x10($30)
8002001C	24 02 00 08		ADDIU	$02, $00, 0x8
80020020	AF C2 00 14		SW	$02, 0x14($30)
80020024	8F C2 00 10		LW	$02, 0x10($30)
80020028	8F C3 00 14		LW	$03, 0x14($30)
8002002C	00 00 00 00		NOP	
80020030	00 43 10 21		ADDU	$02, $02, $03
80020034	AF C2 00 18		SW	$02, 0x18($30)
80020038	03 C0 E8 21		ADDU	$29, $30, $00
8002003C	8F BF 00 24		LW	$31, 0x24($29)
80020040	8F BE 00 20		LW	$30, 0x20($29)
80020044	03 E0 00 08		JR	$31
80020048	27 BD 00 28		ADDIU	$29, $29, 0x28
8002004C	00 00 00 00		NOP	
80020050	3C 02 20 10	start()	LUI	$02, 0x2010
80020054	40 82 60 00		MTC0	$12, $02
80020058	00 00 00 00		NOP	
8002005C	40 80 68 00		MTC0	$13, $00
80020060	00 00 00 00		NOP	
80020064	3C 0B AA AA		LUI	$11, 0xaaaa

LUI $02, 0x2010 ; $2=0

Address mode: Virtual View mode: Assembler

Create variable x in location pointed to by register $30 offset 0x10