

Computer Architecture

Assignment 2

Due: Monday, 23 Nov. (one day before if you submit by email)

Notes: This assignment is individual assignment, every student should complete by himself.

- 1. (10 points) Indicate whether the following belongs to ISA or the Microarchitecture layer and describe each statement in no more than 2 lines.**
 - a. Pipelining
 - b. In-order versus out-of-order instruction execution
 - c. Memory Address space ,and Alignment
 - d. Memory access scheduling policy
 - e. Opcodes, Addressing Modes, Data Types
 - f. Speculative execution
 - g. Superscalar processing (multiple instruction issue)
 - h. Prefetching
 - i. Voltage/frequency scaling
 - j. Task/thread Management

- 2. (10 points) Write the appropriate algorithm to solve the following problems, then state which ISA model (Von Neumann or Data Flow) could be better to solve it and why?. If the problem should be solved with the Data flow model, draw the Data Flow diagram for this problem.**
 - a. Binary Search.
 - b. Fibonacci Sequence.

3. (10 points) The following code is an x86 assembly program to compute the factorial for a predefined number n.

```

INCLUDE Irvine32.inc
.data
n byte 3

.code
main PROC
    call Clrscr

    mov eax, 1
    movzx ecx, n
startLoop:
    mul ecx
    loop startLoop

    call WriteInt
    call crlf

    exit
main ENDP
END main

```

Refer to the following ARM assembly language reference or any other ARM reference. Then complete the following tasks:

<http://www.heyrick.co.uk/assembler/qfinder.html>

- Convert the above program into ARM assembly program
- Test the ARM program using the following simulator

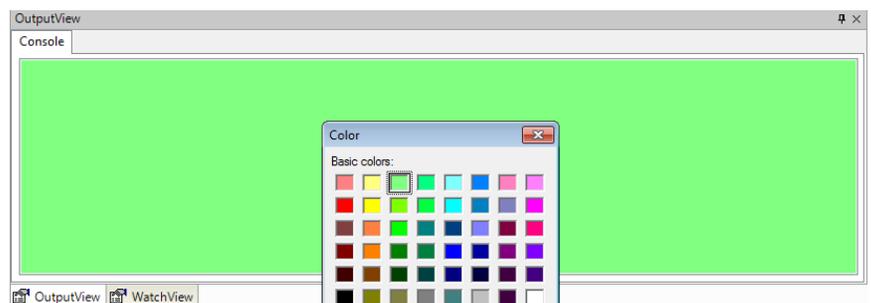
<http://armsim.cs.uvic.ca/DownloadARMSimSharp.html>

- Replace the background color for “output view Console” of the simulator as following: Basic color number= (48 mod YourSerial #) as following:

(احمد سعد حسين)=3

Basic Color=3 mod 48=

3rd color in the plate



- Take screenshot for the simulation result and include with your solution report.