NANYANG TECHNOLOGICAL UNIVERSITY

QUIZ

EE3002 – Microprocessors

30 March 2015 **Time Allowed: 30 minutes**

INSTRUCTIONS:

1. This booklet consists of 5 pages, including this cover page.
2. There are 20 multiple choice questions. All questions carry equal marks.
3. Answer all 20 questions. Shade the most suitable answers from 1 – 20 in the computerized answer sheet provided.

4. Write and shade your matriculation number on the **computerized answer sheet.**

5. The course code is EE3002/IM2002. Instead of writing course title, **write your name**. Leave the seat number empty.
6. Write your name and matriculation number on this cover page and **hand in this booklet together with the computerized answer sheet at the end of the test.**

Name: _____

Matriculation Number:

1. The ARM7TDMI processor has how many flags, modes and states.

a. 4 flags,1 mode and 7 states
b. 5 flags, 2 modes and 6 states
c. 3 flags, 7 modes and 2 states
d. 2 flags, 6 modes and 2 states
e. None of the above

2. Which of the following number(s) is/are NaN(s) in IEEE 754 format?

a. 0xFF800001
b. 0xFFFFFFFF
c. 0x7FD55555
d. None of the above
e. All of the above

3. Represent the decimal number, −11, using 32-bit precision 2's complement form.

a. 0x8000000B
b. 0xFFFFFFF5
c. 0xEFFFFFFF
d. 0x80000005
e. None of the above

4. What are the stages in ARM7TDMI pipeline architecture?

a. ARM7TDMI doesn't use pipeline architecture.
b. FETCH, EXECUTE, DECODE
c. FETCH, DECODE, EXECUTE, MEMORY, WRITE
d. DECODE, EXECUTE, FETCH
e. FETCH, DECODE, EXECUTE

5. Consider the following instructions and determine the values of the NZCV flags.

```
MOV r0, #8
SUBS r1, r0, r0
```

a. N = 0, Z = 1, C = 1, V = 0
b. N = 0, Z = 0, C = 0, V = 0
c. N = 1, Z = 0, C = 1, V = 1
d. N = 1, Z = 1, C = 0, V = 0
e. None of the above

6. Convert the decimal number, 5.5, into a binary number, the answer is :
a. Cannot be converted
b. 101.1
c. 101.101
d. 1.1
e. Can have many different answers.

7. Which of the following statements is incorrect?
a. Score DCB 256
b. Data DCB −128, 128
c. Marks DCB −1, 255
d. Coeff DCB 1, 2, 3, 4, −128, 255
e. All of the above

8. Which of the following is(are) incorrect?
a. r1 is also known as a1
b. r13 is also known as Sp
c. r14 is also known as Lr
d. r15 is also known as Pc
e. All of the above.

9. Which of the following instructions uses pre-indexed addressing modes:
a. STR r6, [r4]
b. LDR r3, [r12], #6
c. STR r4, [r3, r1]!
d. STR r5, [r4], r0, LSR #4
e. None of the above

10. In ARM assembly language, the mnemonic for integer division instruction is
a. IDIV
b. DIV
c. IDIVS
d. FDIV
e. No such instruction

11. What operation do the two following lines of code perform?

```
ADD r0, r1, r1, LSL #5
ADD r0, r0, r1, LSL #2
```

a. r0 = r1*37
b. r0 = r1*36
c. r0 = r1*35
d. r0 = r1*34
e. none of the above

12. Which of the following statement about the barrel shifter in ARM7TDMI is incorrect?

a. The barrel shifter only works on the second operand of the ARM instructions.
b. The barrel shifter only works on the first operand of the ARM instructions.
c. The barrel shifter can be used to perform certain multiplications.
d. The barrel shifter can be used to perform certain divisions.
e. The operation of the barrel shifter is extremely fast.

13. Which of the following are NOT all assembler rules or directives?

a. ENTRY, MEND, MACRO
b. DCD, DCDU, DCW
c. ALIGN, SPACE, RN, LTORG
d. EQU, DCWU, DCB
e. MRS, MSR, AREA, END

14. Consider the assembly statement "BNE loop". Which of the following statements is correct?

a. The program will branch to the label loop when the C flag is set.
b. The program will branch to the label loop when the Z flag is clear.
c. The program will branch to the label loop when the C flag is clear.
d. The program will branch to the label loop when the Z flag is set.
e. None of the above.

15. Which of the follow interpretation of the instruction STMFD r13!, {r4- r7} is correct?

a. Push r4, r5, r6 and r7 onto the stack and update r13.
b. Pop r4, r5, r6 and r7 from the stack and update r13.
c. Increase r13 before popping out r4, r5, r6, and r7.
d. Decrease r13 after pushing r4, r5, r6 and r7 onto the stack.
e. None of the above

16. The STMIB sp!, <reg-list> and LDMDA sp!, <reg-list> instructions are used to access the stack of a program. What type of stack is used here?

a. Full Descending (FD)
b. Full Ascending (FA)
c. Empty Descending (ED)
d. Empty Ascending (EA)
e. Increment After (IA)

17. Which of the following instructions is used to load an element of a table to a register? Assume that the elements in the table are 16-bit numbers.
    a. LDR r1, =table_base
    b. STR r1, [r0, r2, LSL #2]
    c. LDRH r1, [r0, r2]
    d. LDRH r1, [r0, r2], #4
    e. STRH r1, [r0, r2, LSL #1]

18. When BL <target> instruction is executed, the following action takes place. Assume that the address of this instruction is 0x0000000C and the <target> address is 0x0000002C. The processor is operating in the ARM state.
    a. Registers pc and lr are loaded with 0x0000002C and 0x0000000C, respectively.
    b. Registers pc and lr are loaded with 0x0000000C and 0x0000002C, respectively.
    c. Registers pc and lr are loaded with 0x0000002C and 0x00000014, respectively.
    d. Registers pc and lr are loaded with 0x0000000C and 0x00000010, respectively.
    e. Registers pc and lr are loaded with 0x0000002C and 0x00000010, respectively.

19. Which of the following instructions cannot be used for a subroutine to return to the calling program?
    a. STMIA sp!, {r0-r7, lr}
    b. MOV pc, lr
    c. LDMIB sp!, {r0-r7, pc}
    d. BX lr
    e. None of the above

20. Which of the following best describe a bubble sort?
    a. It can only be sorted in ascending order.
    b. It can only be sorted in descending order
    c. The largest number can be moved to the top or bottom of the sequence in the first pass
    d. It compares all even numbered items and swaps them if they are in the wrong order.
    e. It compares all odd numbered items and swaps them if they are in the wrong order.