VACCINATION!

OLLSCOIL NA hÉIREANN, CORCAIGH
THE NATIONAL UNIVERSITY OF IRELAND, CORK

COLAISTE NA hOLLSCOILE, CORCAIGH
UNIVERSITY COLLEGE, CORK

2015/2016

Semester 2 - Summer 2016

CS1111: Systems Organization II

Dr Helen Purchase
Professor Cormac Sreenan
Professor J.P. Morrison

1.5 hours

Attempt all questions.
All Questions Carry Equal Marks.
Total Mark for this Paper is 80.
(For information: Minutes/Mark = 1.125)

SPECIAL REQUIREMENTS
None

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PLEASE ENSURE THAT YOU HAVE THE CORRECT EXAM PAPER

Question 1 (Parts (a) to (h))

a)

1. How is information stored on a hard disk? (4 marks)
2. Name the parameters that affect the transfer rate between the disk and the CPU. (2 marks)
3. How are these parameters and the transfer rate related? (1 mark)
4. In a multi-platter disk, how can information be organised to speed up access? (3 marks)

b) Describe the PS/2 protocol for communicating information on the movement of a mouse to a PC: how many bytes are transferred for each position report and what does each byte represent? ? (8 marks)

c) In a microprocessor, what is the purpose of each of the following:

1. Instruction Register
2. Program Counter
3. Status Register
4. Control Unit
5. ALU (5 marks)

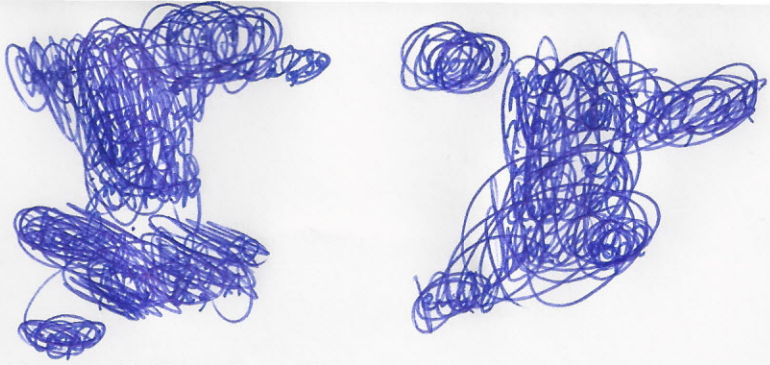
d) What is Bus Arbitration and why is it required? Name two arbitration schemes and distinguish between them. (4 marks)

e) What is a file system? Name two types of file systems. (3 marks)

f) What is the purpose of an operating system? Name its major functional components. ? (4 marks)

g) What is the difference between a multiprogramming operating system and a time-sharing operating system? ? (3 marks)

h) What is Cloud Computing? Name the three most common cloud deployment models. (3 marks)



Question 2 (Parts (a) to (i))

a) What is an Instruction Set Architecture? (2 marks)

b) Given the two 32-bit number, 7fac13b4, and assuming a 32-bit word, show how this number would be stored in memory using both Big-endian and Little-endian schemes. (4 marks)

c) What does it mean for word locations to have aligned addresses? Give an advantage and a disadvantage of word alignment in memory (4 marks)

d) What is the difference between an assembler directive and an assembly instruction? Name two Samphire assembler directives. (4 marks)

e) The same assembly mnemonic, in different instructions, may be translated into different op-codes by the assembler. Why? (2 marks)

f) If the Samphire assembler generates the machine code C0 FD from the instruction `jmp label`, is the label before or after the jmp instruction? Why? (2 marks)

g) What registers are affected, and how are they affected, when the Samphire instruction: `call 50` is executed? (2 marks)

h) Write a Samphire program that places 10 numbers in memory at address 80 and adds them together. Write the result to the VDU, assuming that it is two-digit number. (10 marks)

single-digit?

i) Write a Samphire program that reads 10 numbers in from the keyboard and then writes them out, in reverse order, to successive locations in the VDU. (10 marks)