AD006 Associate Degree in Information Technology

COSC 2510 Introduction to Computer Systems and Platform Technologies

Semester 1 2023

Laboratory Exercise 1

Task 1: Working on a quote for new computers for a client's network (10 points)
Task 2: Number Systems & Logic Gates (15 points)

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- This assessment is worth **15**% of your total marks.
- Due Dates:
  Group **F3AA** – Thursday 09/03, 12.30 PM
  Group **F3AB** – Friday 10/03, 12.30 PM
  Group **F3AC** – Monday 06/03, 10.30 AM
  Group **F3AD** – Friday 10/03, 10.30 AM
  Group **F3AE** – Thursday 09/03, 3.30 PM
  Group **F3AF** – Friday 10/03, 12.30 PM
  Groups **F3AT & F3AU** – Thursday 09/03, 5.00 PM

- This is **an open-book** assessment. You are allowed to use class materials, your notes, and search the Internet.
- This assessment is a **group work** (**two students** per group).
- Name this lab file **student1number_student2number_lab1** (Example: s1234567_s7654321_lab1).
- **Each group member must submit the file to Canvas as a Word Document** (**Assignments** **Lab Exercise 1**).
- Submit your work to Canvas.
- **Note:** Labs submitted from home will not be graded.
- Please make sure that you submit the lab before the due date/time for your group.

Extensions

If you will not be able to meet the due date for an assessment you may apply to your teacher for an extension of up to seven days by completing the Application of Time to Submit Assessment Work Form at

https://www.rmit.edu.au/content/dam/rmit/documents/Students/Student_forms/Application-for-extension-of-time-to-submit-work.pdf

Applications for an extension of time must be received before the due date for an assessment.

Special Consideration

If unforeseen circumstances beyond your control prevent you from submitting your work on time you may be eligible to apply for special consideration. For further information regarding special consideration, please refer to the RMIT Special Consideration page at

https://www.rmit.edu.au/students/student-essentials/assessment-and-results/special-consideration

Academic Integrity

In addition to meeting assessment timelines academic integrity is about honest presentation of academic work. Students must be accountable for the originality and validity of assessment submission, and not assist others in any form of plagiarism or cheating.

https://www.rmit.edu.au/students/student-essentials/assessment-and-exams/academic-integrity

Task 1 - Working on a quote for new computers for a client's network (10 points)

ABC Public Libraries received a **$48,000** federal grant to add **20 new** (**10 PCs** and **10 iMacs**) computers to the library system.

For network integrity and support purposes, they require that all new computers meet the hardware specifications and software requirements.

PC Specifications (All-in-One or Computer Case + Monitor)

Item	Minimum Acceptable Specifications for New Computers
Processor (Intel or AMD)	Intel Core i5 (Max Turbo Frequency up to 4.20 GHz) or AMD Ryzen 5 (Max Turbo Frequency up to 4.20 GHz)
Memory	8 GB
Hard Drive (SSD or/and HDD)	512 GB (or 500 GB)
Monitor	24-inch Screen
Operating System	Windows 10 Pro or Windows 11 Pro
Office	Microsoft 365 Business Standard (Annual Subscription for 10 Users)

iMac Specifications (All-in-One)

Item	Minimum Acceptable Specifications for New Computers
Processor	Apple M1 Chip with 8-core CPU
Memory	8 GB
Hard Drive (SSD)	512 GB (or 500 GB)
Monitor	24-inch Screen
Operating System	macOS - any version macOS Ventura is the latests version.
Office	Microsoft 365 Business Standard (Annual Subscription for 10 Users)

You can significantly improve the performance of computers and increase their useful life by configuring it at a higher level. The best value-added upgrades are additional memory, a faster processor, and larger hard drive.

You are required to create a quote for purchasing 20 personal computer systems.

Note:
- To find prices, check your favourite on-line computer shop(s) in Australia.
- Don't buy parts (motherboard, power supply, etc). Buy a pre-built computer.
- PCs can be desktop (computer case + monitor) computers or all-in-one computers.
- Computers must be new (not refurbished).

PC Specifications

PC Specifications (All-in-One or Computer Case + Monitor)

Item	Selected Component	Website Link(s)	Price
Processor	AMD Ryzen 5 5500 (Thread up to 4.2ghz)	https://www.ple.com.au/Products/656899/ple-galaxy-rtx-3060-ready-to-go-gaming-pc	$1799.0
Memory	G.Skill 16GB		
Hard Drive	Seagate 2TB Hard Drive		
Monitor	Levnovo D27-30 27'' Full HD Monitor	https://www.jbhifi.com.au/products/lenovo-d27-30-27-full-hd-monitor	$244
Operating System	Microsoft Windows 11 Home		
Office	Microsoft 365 Business Standard	https://www.centrecom.com.au/microsoft-365-business-standard-klq-00648-	$178

		retail-box-1-year-subscription	

Note: If an operating system and monitor are purchased from different online shops, include all links (system, monitor, operating system).

Price (per computer) **$2 221**

Total Price (10 computers) **$22 210**

iMac Specifications

iMac Specifications (All-in-One)

Item	Selected Component	Website Link	Price
Processor	Apple M1 Chip 8-core CPU	https://www.jbhifi.com.au/products/apple-imac-with-retina-4-5k-display-24-inch-8-core-gpu-512gb-blue-2021?store=243&gclid=EAIaIQobChMIx_3pkoXQ_QIVjJJmAh082QasEAQYAiABEgL2g_D_BwE	$2249
Memory	8gb		
Hard Drive	512gb SSD		
Monitor	24 inch		
Operating System	macOS Big Sur		
Office	Microsoft office 365 Business Standard	https://www.centrecom.com.au/microsoft-365-business-standard-klq-00648-retail-box-1-year-subscription?gclid=EAIaIQobChMI4PjN4YXQ_QIVCJ1LBR2	$178

		c0g85EAQYASABEgLxMfD_BwE	

Price (per computer) **$2427**

Total Price (10 computers) **$24270**

Total Price (20 computers) **$46 480**

Note: The total price for 20 computers should not exceed $48,000.

Task 2 – Number Systems & Logic Gates (15 points)

1. Form a line according to a binary length of the following numbers (shortest to longest). **(2 points)**

   Answer: 18_{10} 56_{8} ASCII Code 1010101100_{2} $DB5_{16}$ IPv4 MAC Address IPv6

2. What is wrong with the following IPv6 address: **2001:0db8:75a3:0214:0607:1234:ha10:ba01**? **(1 point)**

   Answer: IP included h, hexadecimal doesn't have h in it

3. What is wrong with the following IPv4 address: **192.257.2.5? (1 point)**

   Answer: The second byte of the IP Address goes above 255

4.
   a) AND the following binary numbers. **(1 point)**
   11001110 AND 00111110

   Answer:0000 1110

   b) ADD the following binary numbers. (**1 point)**
   11001110 + 00111110

   Answer: 0001 0000 1100

5. How do you tell if a binary number is even or odd? **(1 point)**

   Answer: You can tell if it is odd or even depending on the first digits of the binary number. if it is 1, it is odd, if it is 0 it is even

6. List two uses of the hexadecimal number system. **(2 points)**

   Answer:
   - **It can be used for bits pattern and colour**
   - **Addresses of locations in RAM are given in hexadecimal numbers**

7. What will be the result (in HEX) if you add $CAFE_{16}$ and $F00DS_{16}$? **(1 point)**

Answer: You can't! There is no S in hex

8. Fill in the **Cross-Dec_to_Bin. (2 points)**

Note: The clues (ACROSS, DOWN) are decimal numbers, and the answers are binary numbers ('0's and '1's).

		1 1	2 0		
	3 1		0 1		
4 1	0	0	0	1	0
5 0	1	0	1	0	0
	6 0	1	1		

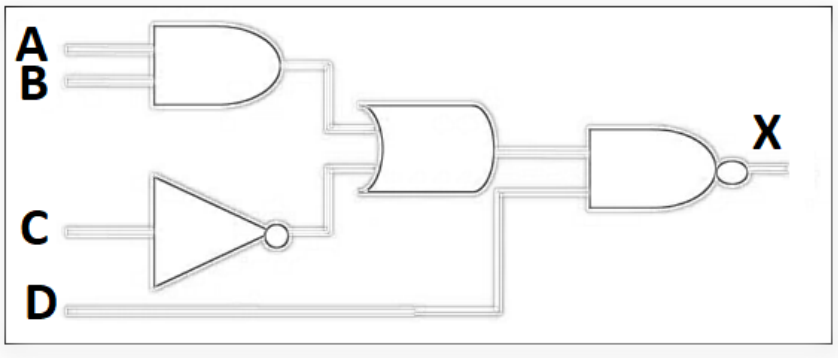
ACROSS	DOWN
1: 2	1: 17
3: 5	2: 11
4: 34	3: 10
5: 20	
6: 3	

Example:

ACROSS 5: 20

5 0	1	0	1	0	0

9. Determine the output **X (zero or one)** if **A** and **D** are **1** (one), and **B** and **C** are **0** (zero). **(1 point)**



Answer: (((a.b)+c')d)'

10. How many and which logic gates are required to implement the following Boolean expression?

(2 points)

$$X = (AB)' + (B + A')(B + C)'(AC')$$

Logic Gate	Number of Gates Required
NOT Gate (Inverter)	2
2-input AND Gate	2
3-input AND Gate	1
2-input NAND Gate	2
3-input NAND Gate	0
2-input OR Gate	2
3-input OR Gate	0
2-input NOR Gate	1
3-input NOR Gate	0
Total Number of Logic Gates Required	10