APPLIED COMPUTER SCIENCE

ACS-2906-002

Computer Architecture and System Software

Winter 2025

Laboratory 1

Due date: January 17, 2025 **Total marks: 10**

Motivation

The goal of this laboratory is to get students thinking about different level of abstractions presented in computer systems.

Questions

1. (1 pts) Suppose a computer finds the following binary number while executing some operations:

   0 1 1 0 1 0 0 0

Given that 01101000 is 104 in decimal notation and that number maps to the character 'h' in the ASCII code, can we state that a computer system ***always*** will interpret 01101000 as the character 'h'?

2. (1 pts) Why, as programmers, is it worth knowing how a computer system works? Mention at least 2 benefits.

3. (2 pts) Describe the three abstraction elements that an operating system uses.

Element			
Description			

4. (1 pts) Describe the trade-off for storage devices in a computer system.

5. (5 pts, 1 point each) Decide if the following statements are **True** or **False**, and provide an explanation for your answer.

Statement	True or False. Why?
In a system using 3 bits to represent integers (values between 0 and 7), is the algebraic inequality 3*3 > 0 satisfied?	
Accessing to register file is faster than accessing the main memory	
Can different process share the same the virtual memory addresses	
Hard disk serves as caches for the L1 memory	
The operating systems translate high-level languages to machine language	

Evaluation:

- Cite all sources used to answer each question, including the course slides and/or recordings. If you believe you can answer the question without a reference, provide a description on where you have gained your knowledge. For example, name the high school course in which you gained your knowledge, or the fact that you work with computers in your spare time, etc.
- Answer all questions in your own words. How do you do this? Read your references before you start writing. Make sure you understand the concept(s) you want to put into your paper. Take a pause before you write about the ideas you have read. Then, write as though you are explaining the idea to someone who has never heard it before. After you have explained the idea, and you are satisfied with what you wrote, add a reference to the original source.
- By following this process, you will not be copying directly the words of others (which is plagiarism), and by including the citation you will be recognizing that the idea or information was written by someone else.
- Do not start writing immediately if you have to go back and reread the article. This means it is not clear in your head. Writing about a subject is a lot easier if you understand the concepts in advance, rather than reading a little, writing a little, etc. **Be sure to check the course syllabus if you do not understand academic misconduct.** There are plenty of resources to help ensure you do not get into trouble.

Submission instructions

Your writeup to these questions must be created using a professional word processors. In other words, you cannot use notepad or wordpad! Include your name and student number in all files. Use this handout as an example of good formatting. Submit the laboratory via the Nexus website. Students that do not follow these instructions will lose 2 marks. Late submissions will not be accepted. NO EXCEPTIONS.