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Computer Science 306 - Assignment 2: Converting Numbers & Truth Tables

If you have a Study.com College Saver membership and are seeking college credit for this course, you must submit an assignment and pass the proctored final exam. Below you will find prompts and instructions for submitting your assignment.

About this Assignment

In this assignment, you will apply knowledge gained throughout the course. You will be converting numbers to different numerical systems (binary, octal, hexadecimal). You will also create truth tables for various logic gates. Upon completion of this assignment, you will be able to:

- Convert numbers from decimal to binary, octal, and hexadecimal
- Convert hexadecimal, octal, and binary to different number systems
- Generate truth tables for logic gates and functions

Prompt

Computers store data in 1s and 0s (binary), octal, and hexadecimal numerical representations. In this assignment, you will perform conversion of data from the standard base-10 system to other numerical systems.

Part 1 - Number Systems

For the operations below, be sure to show your work! Do not simply put the numbers through a calculator or online tool and post the results. We should be able to follow your logic as you solved the problem.

1. Complete the following addition problem in hexadecimal: 32154AAAA + FEDCBA092. Show the answer in hexadecimal and in decimal.
2. Convert the Decimal number 4048891811 to hexadecimal.
3. Convert the Octal number 2114112 to Decimal.
4. Expand the following table to include decimal numbers from 11 to 16, and expand the table to include hexadecimal numbers.

Binary	Octal	Decimal	Hexadecimal
000	0	0	
001	1	1	
010	2	2	
011	3	3	
100	4	4	
101	5	5	
110	6	6	
111	7	7	
1000	10	8	
1001	11	9	
1010	12	10	

		11	
		12	
		13	
		14	
		15	
		16	

Part 2 - Truth Tables and Logic Gates

State the Boolean Expression and truth table for the following logic gates:

- NAND
- NOR
- XOR
- NOT
- 3-input AND gate (inputs A, B, C, and output X)

Part 3 - Reflection

Answer the following question, providing examples and citing relevant research. Your reflection should be between 500 and 750 words:

- Why is it important to study how to manipulate fixed-point numbers? Provide examples of these systems in use.

You must use relevant, scholarly research in your answer (see below for formatting and citations).

Related Lessons

If you'd like to review Study.com course material for this assignment, please refer to the following lessons:

- Converting Floating Point Values in the Binary Numerical System
- Converting Between Binary, Decimal, Octal & Hexadecimal Numbers
- Electric Gate Symbols for Boolean Functions
- Propositions, Truth Values and Truth Tables

Formatting & Sources

Please write your reflection in the APA format. You may refer to the course material for supporting evidence, but you must also use **3 sources** and cite them using APA format. Please include a mix of both primary and secondary sources, with at least one source from a scholarly peer-reviewed journal. If you use any Study.com lessons as sources, please also cite them in APA (including the lesson title and instructor's name).

- Primary sources are first-hand accounts such as interviews, advertisements, speeches, company documents, statements, and press releases published by the company in question.
- Secondary sources come from peer-reviewed scholarly journals, such as Journal of the ACM, The Computer Journal. You may use sources like JSTOR and Google Scholar to find articles from these journals. Secondary sources may also come from reputable websites with .gov, .edu, or .org in the domain. (Wikipedia is not a reputable source, though the sources listed in Wikipedia articles may be acceptable.)

If you're unsure about how to use APA format to cite your sources, please see the following lessons:

- What is APA Format? Style & Definition
- How To Format APA Citations

Grading Rubric

Your essay will be graded based on the following rubric:

Category	**Unacceptable (0-1)**	**Needs Improvement (2-3)**	**Good (4)**	**Excellent (5)**	**Total Possible Points**
Hexadecimal addition	Wrong or no answer provided	No or limited work shown for solving the problem	N/A	Correct answer provided	5
Decimal conversion to hexadecimal	Wrong or no answer provided	No or limited work shown for solving the problem	N/A	Correct answer provided	5
Octal conversion to decimal	Wrong or no answer provided	No or limited work shown for solving the problem	N/A	Correct answer provided	5
Numeric values table	Wrong or no answer provided	No or limited work shown for solving the problem	N/A	Correct answer provided	5
NAND truth table	Table is wrong or is missing	Table is missing over half of the values	Table missing all but one or two values	Table is complete and accurate	5
NOR truth table	Table is wrong or is missing	Table is missing over half of the values	Table missing all but one or two values	Table is complete and accurate	5
AND truth table	Table is wrong or is missing	Table is missing over half of the values	Table missing all but one or two values	Table is complete and accurate	5
XOR truth table	Table is wrong or is missing	Table is missing over half of the values	Table missing all but one or two values	Table is complete and accurate	5
NOT truth table	Table is wrong or is missing	Table is missing over half of the values	Table missing all but one or two values	Table is complete and accurate	5
Reflection paper	Paper provides meaningless information; does not answer the question	Paper less than the required length, does not cite evidence, or does not fully answer the question	Paper answers the question with little or no elaboration	Comprehensive evaluation and exploration of the question; relevant research cited	5
Total Points					50

Before You Submit

Before you submit your assignment, please review the Academic Integrity Policy to ensure that you fully understand what constitutes plagiarism and its consequences.

Written assignments should be **completely original, free of any plagiarism, and properly cited**. Plagiarizing your assignments may result in an automatic zero for your assignment or course grade, and the potential termination of your Study.com subscription.

We recommend proofreading your assignment and verifying that it's completely original by using an online plagiarism checker such as PlagScan or Duplichecker to make sure that your assignment is not too similar to any existing materials.

Unless otherwise stated in the assignment instructions, AI-generated content is not permissible. The use of ChatGPT or other AI applications to generate work presented as your own is a form of plagiarism. Plagiarized submissions will NOT be graded and may result in disciplinary actions.

How to Submit Your Assignment

When you are ready to submit your assignment, **please fill out the following submission form by attaching your assignment as a Microsoft Word file**. After turning in your assignment, you may go ahead and take the proctored final exam. You do not need to wait for your written response to be graded. You should receive your assignment grade within one week.

If you are not satisfied with the score you receive on your assignment, you may revise or rewrite it, and resubmit them for grading using the same submission form above. Keep in mind that the grade you receive on your assignment is only a portion of your overall grade for the course, and you are free to retake the proctored final exam as well if you choose. Please see the course syllabus for a more detailed breakdown of the grading policy.