COSC 243 (Computer Architecture)
Data Representation Test

Example Test

Questions 15 and 16 are worth 6 point each. Each part of question 17 is worth 4 points. All other questions are worth 2 points each. The maximum number of points for this test is 60. You should show your work as partial marks may be given. You MUST show the steps taken in questions 15 and 16. For question 17, you MUST convert the decimal numbers into the two's complement form, perform the arithmetic on the two's complement form, and convert the result into a decimal number.

1. Convert 567_{10} to binary.
2. Convert $1011\ 0101_2$ to decimal.
3. Convert 110010111010010_2 to octal.
4. Convert 7423_8 to binary.
5. Convert 110010111010010_2 to hexadecimal.
6. Convert $8FE3_{16}$ to binary.
7. Convert 638_{10} to hexadecimal.
8. Convert -78_{10} to excess 100 form.
9. If $1100\ 1010_2$ is in excess 140 form, what decimal number is represented?
10. Convert -93_{10} to sign magnitude form using 8 bits to represent the result.
11. Convert -93_{10} to two's complement form using 8 bits to represent the result.
12. Convert 68_{10} to two's complement form using 8 bits to represent the result.
13. If $1100\ 1010_2$ is in two's complement form, what decimal number is represented?
14. If $0101\ 0110_2$ is in two's complement form, what decimal number is represented?
15. Convert 123.6875_{10} to IEEE format.
16. Convert $458D\ A600_{16}$ from IEEE format to decimal form.

PTO

17. Using two’s complement form with 8 bits, perform the following arithmetic.

    a. Add 34 and 27.

    b. Add -34 and -27.

    c. Subtract 45 from 78.

    d. Subtract -45 from 78.

    e. Subtract 45 from -20.