Mechatronics
Department
CSE115

Faculty of Engineering
Ain Shams University

Digital Design

Sheet 1

1) Perform the following number system conversions:
   a) $1101011_2 = ?_{16}$
   b) $174003_8 = ?_2$
   c) $10110111_2 = ?_{16}$
   d) $67.24_8 = ?_2$
   e) $10100.1101_2 = ?_{16}$
   f) $F3A5_{16} = ?_2$
   g) $11011001_2 = ?_8$
   h) $AB3D_{16} = ?_2$
   i) $101111.0111_2 = ?_8$
   j) $15C.38_{16} = ?_2$

2) Convert the following hexadecimal numbers into binary and octal:
   a) $1023_{16} = ?_2 = ?_8$
   b) $7E6A_{16} = ?_2 = ?_8$
   c) $ABCD_{16} = ?_2 = ?_8$
   d) $C350_{16} = ?_2 = ?_8$
   e) $9E36.7A_{16} = ?_2 = ?_8$
   f) $DEAD.BEEF_{16} = ?_2 = ?_8$

3) Convert the following numbers into decimal:
   a) $1101011_2 = ?_{10}$
   b) $174003_8 = ?_{10}$
   c) $10110111_2 = ?_{10}$
   d) $67.24_8 = ?_{10}$
   e) $10100.1101_2 = ?_{10}$
   f) $F3A5_{16} = ?_{10}$
   g) $12010_3 = ?_{10}$
   h) $AB3D_{16} = ?_{10}$
   i) $7156_8 = ?_{10}$
   j) $15C.38_{16} = ?_{10}$

4) Perform the following number system conversions:
   a) $125_{10} = ?_2$
   b) $3489_{10} = ?_8$
   c) $209_{10} = ?_2$
   d) $9714_{10} = ?_8$
   e) $132_{10} = ?_2$
   f) $23851_{10} = ?_{16}$
   g) $727_{10} = ?_5$
   h) $57190_{10} = ?_{16}$
   i) $1435_{10} = ?_8$
   j) $65113_{10} = ?_{16}$

5) Suppose a 4n-bit number B is represented by an n-digit hexadecimal number H. Prove that the two's complement of B is represented by the 16's complement of H. Make and prove true a similar statement for octal representation.

6) Repeat *problem 5* using the ones' complement of *B* and the 15s' complement of *H.*