Introduction to Programming and Data Structures – Mock Test 2

Name:
Roll Number:

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1. Prove that a number *n* is a power of 4 if the following conditions are met.
   a) *n*.& (*n* – 1) is zero.
   b) *n*.& 0xAAAAAAAA is zero.

   Answer:

2. Prove that for any arbitrary Boolean expressions A, B and C, the following will hold.
   (A and B) or ((not A) and C) = (A or C) and ((not A) or B)

   Answer:

3. Prove that a signed integer representation with a memory capacity of *n* bits have the possible values in the range -2^{n-1} to $2^{n-1}-1$. Recall that signed positive and negative integers are designated in simple binary and 2's complement forms, respectively.

   Answer:

4. Prove that both (m & ~n) = 0 and (~m & n) = 0 hold, if and only if m = n for integers, m and n.

   Answer:

5. Prove that (n & 0x1) = 0 will hold, if and only if n is even for integers n.

   Answer:

6. Prove that (n<<3) + (n<<1) will perform left rotation of the decimal digits in n by one position with zero padding for integers n.

   Answer: