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Group: TXL22S1-B

1. **Number conversions** 
   1. Convert following numbers to binary numbers
      1. 5510 = 1∙25 + 1∙24 + 1∙23 + 0∙22 + 1∙21 + 1∙20 = 11 01112
      2. 67710 = 1∙29 + 0∙28 + 1∙27 + 0∙26 + 1∙25 + 0∙24 + 0∙23 +1∙22 + 0∙21 + 1∙20 = 10 1010 01012
      3. 6510 = 1∙26 + 0∙25 + 0∙24 + 0∙23 + 0∙22 + 0∙21 + 1∙20 = 100 00012
      4. 70010 = 1∙29 + 0∙28 + 1∙27 + 0∙26 + 1∙25 + 1∙24 + 1∙23 + 1∙22 + 0∙21 + 0∙20 = 10 1011 11002
   2. Convert following base-10 numbers to 2-complement 8 bits numbers.
      1. +59 = -0∙27 + 0∙26 + 1∙25 + 1∙24 + 1∙23 +0∙22 + 1∙21 + 1∙20 = 0011 10112
      2. -1 = -1∙27 + 1∙26 + 1∙25 + 1∙24 + 1∙23 +1∙22 + 1∙21 + 1∙20 = 1111 11112
      3. -128 = -1∙27 + 0∙26 + 0∙25 + 0∙24 + 0∙23 +0∙22 + 0∙21 + 0∙20 = 1000 00002
      4. -97 = -1∙27 + 0∙26 + 0∙25 + 1∙24 + 1∙23 +1∙22 + 1∙21 + 1∙20 = 1001 11112
   3. Convert the following unsigned numbers to the specified radix and size if it is possible. If conversion is not possible state the reason why.
      1. 0xE5 → 8 bit binary

E516 = 11102 + 01012 = 1110 01012

* + 1. 0x3F1 → 8 bit binary

3F116 = 00112 + 11112 + 00012 = 0011 1111 00012 → Can’t convert to 8 bit binary

* + 1. 0x3E8 → 10 bit binary

3E816 = 00112 + 11102 + 10002 = 0011 1110 10002 → 11 1110 10002

* + 1. 0x73B → 16 bit binary

73B16 = 01112 + 0011 + 10112 = 0111 0011 10112 → 0000 0111 0011 10112

* + 1. 0011 00102 → 10 bit binary

0011 00102 → 00 0011 00102

* + 1. 0000 0100 1000 10112 → 12 bit binary

0000 0100 1000 10112 → 0100 1000 10112

* + 1. 1101 10012 → 16 bit binary

1101 10012 → 0000 0000 1101 10012

* + 1. 0010 0011 10112 → 8 bit binary

0010 0011 10112 → Can’t convert to 8 bit binary

* 1. Convert the following signed two’s complement numbers to the given size if possible. If conversion is not possible state the reason why.
     1. 1001 11012 → 12 bit binary

1001 11012 = -9910 = 1111 1001 11012

* + 1. 0001 00012 → 16 bit binary

0001 00012 = 1710 = 0000 0000 0001 00012

* + 1. 1111 1111 1010 11112 → 8 bit binary

1111 1111 1010 11112 = -8110 = 1010 11112

* + 1. 1110 1011 1001 00012 → 12 bit binary

1110 1011 1001 00012 = -523110 → Smaller than smallest 12 bit binary (-2048) → Can’t convert to 12 bit binary

* + 1. 0xFAC → 16 bit binary

FAC16 = 11112 + 10102 + 11002 = 1111 1010 11002 → 0000 1111 1010 11002

→ 1111 0000 0101 01002

* + 1. 0x0F → 16 bit binary

0F16 = 00002 + 11112 = 0000 11112 → 0000 0000 0000 11112 → 1111 1111 1111 00012