Assignment 01

Review and Exercise Questions

Due Friday midnight 11:59pm (D2L)

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| Name: | Student Number: | Set: |

**Learning Objectives:**

* Review data representations, number manipulations, etc.
* Warm up and review with some programming, especially with numbers
* See if you can do these exercises without calculator or built-in-functions

Short Answers:

1. What is the decimal of these numbers:
   1. 00110101
   2. 10010110
   3. 11001100
2. What is the result:
   1. 10101111 + 11011011
   2. 10010111 + 11111111
   3. 00001101 minus 00000111
3. What is the minimum number of binary bits needed to represent these numbers:
   1. 4095
   2. 65534
   3. 42319
4. What is the hex representation of these binary numbers:
   1. 0011 0101 1101 1010
   2. 1100 1110 1010 0011
   3. 1111 1110 1101 1011
5. What is the binary representation of these numbers:
   1. 0126F9D4
   2. 6ACDFA95
   3. F6BDC2A
6. What is the 8-bit binary (two complement) of these signed decimal numbers?
   1. -72
   2. -98
   3. -26
7. What are the hex and decimal representations of ASCII character G?
8. What are the hex and decimal representations of UNICODE character 大？ (This Chinese character is pronounced “da” meaning “big”).
9. How many selector bits are needed for a four-input multiplexor?

Algorithm workbench:

Use any language you like for the following programming exercises. Can you do it without built-in functions to do these tasks automatically?

1. Write a function that receives a string containing a 16-bit binary integer. The function must return the string’s integer value.
2. Write a function that receives an integer. The function must return a string containing the hexadecimal representation of the integer.

Optional / Challenge:

1. Write a function that adds two hexadecimal strings each as long as 1000 digits. Returns a hexadecimal string that represents the sum of the inputs.
2. Write a function of multiplies a single hex digit by a hex digit string as long as 1000 digits. Returns a hex string that represents the product.

Submission:

Save answers in file “lastname\_firstname\_01.docx”

Provide code (and any readme files if needed) in zipped folder.

Submit to D2L

Marking:

|  |  |
| --- | --- |
|  | Max |
| Completeness | 1 |
| Correctness | 1 |
| Well-formatted and professional looking | 1 |
| Code is well commented and documented | 1 |
| Proper file naming conventions | 1 |