**IT 101, Fall 2015**

**Homework 1**

1. (10pts) Read the article found at:   
   http://www.technologyreview.com/news/540906/your-smartphone-can-tell-if-youre-bored/

Write a paragraph (around 6 sentences) providing your opinion about both the technology and the impact on society.

Creating an algorithm such as this isn’t terribly difficult so the question I find myself asking is why was it created? At the end of the article there is a quote that mentions boredom leads to depression, but that sounds more like a selling point rather than a reason. It also mentions that this study has led the researchers to want to find out what kind of content others might want to see. From reading this article what I think they’re trying to do is what other big companies are already doing which is creating data profiles so that people can be accurately advertised to. So none of this is new it’s just being presented and applied differently. As for its impact on society we can look around us, people don’t like everything they do to be recorded (NSA), but it comes as the cost of using technology others have created for “free”.

1. (4pts) Do the following base conversions. You must show your work for full credit.
   1. Convert the binary number 10100011 to decimal

1 0 1 0 0 0 1 1

27 26 25 24 23 22 21 20

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128+0+32+0+0+0+2+1 = 163

* 1. Convert the binary number 1011000101110 to hexadecimal

0001 0110 0010 1110

1 6 2 E = 162E

* 1. Convert the decimal number 81 to binary

81%2 = 1

40%2 = 0

20%2 = 0

10%2 = 0

5%2 = 1

2%2 = 0

1%2 = 1

1010001

* 1. Convert the hexadecimal number 8DE6 to binary

8 D E 6

1000 1101 1110 0110 = 1000110111100110

1. (6pts) Consider a field containing 8 bits.
   1. What is the smallest non-negative integer that can be represented by this field?

0

* 1. What is the largest non-negative integer that can be represented by this field?

99,999,999

* 1. How many possible values can be represented by this field? (Hint: this is also called the RANGE)

100,000,000

1. (6pts) The Starship Enterprise is visiting a planet where the inhabitants have 8 fingers. Not surprisingly, they use a base 8 numbering system. The planet provides a beam-down coordinate of 2764 (in base 8). Translate this to base 10 so the crew can safely go on shore leave.

2 7 6 4

83 82 81 80

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2\*512+7\*64+6\*8+4\*1 = 1524

1. (12pts) Look up the ASCII and ANSI (8-bit ASCII) representations. Provide both the binary and decimal values for the following characters:

|  |  |  |
| --- | --- | --- |
| **Character** | **ASCII** | **ANSI** |
| **q** | Dec: 113  Bin: 1110001 | Dec: 113  Bin: 1110001 |
| **Q** | Dec: 81  Bin: 1010001 | Dec: 81  Bin: 1010001 |
| ± | Dec: 241  Bin: 11110001 | Dec: 194 177  Bin: 11000010 10110001 |
| **9** | Dec: 57  Bin: 111001 | Dec 57  Bin: 111001 |

1. (6pts) The following message is encoded in ASCII using eight bits per symbol. What does it say? (Hint: There are 28 characters including spaces and punctuation. Use correct capitalization for full credit.)

01010111 01100101 01101100 01100011 01101111 01101101 01100101 00101110 00100000   
 87 101 108 99 111 109 101 46 32  
  
01011001 01101111 01110101 00100000 01101110 01101111 01110111 00100000 01110010   
 89 111 117 32 110 111 119 32 114  
  
01100101 01100001 01100100 00100000 01000001 01010011 01000011 01001001 01001001   
 101 97 100 32 65 83 67 73 73  
  
00100001

33

Welcome. You now read ASCII!

1. (6pts) The following are parity questions
   1. Assume even parity and add a parity bit to 10010011

100100110

* 1. Is the following data plus parity bit correct for even parity? Why or why not? 101110101

Yes, because there is an even amount of ones which means it is correct for even parity.

* 1. Is the following data plus parity bit correct for odd parity? Why or why not? 010001010

Yes, because there is an odd amount of ones which means it is correct for odd parity.

EXTRA CREDIT (2pts): Correctly naming and submitting your homework as described in Moodle.