COMP9601- Individual Assignment 1

Due Data: 14th of April, 23.59 PM

1. Convert the following numbers by using the repeated subtraction method: (10%)
   a) $(187)_{10} = (?)_3$
   b) $(214)_{10} = (?)_7$

2. Convert the following numbers by using the division-reminder method: (10%)
   a) $(132)_4 = (?)_6$
   b) $(312)_5 = (?)_2$

3. Represent the following numbers in binary by using the two's complement method: (10%)
   a) -94
   b) -175

4. By using the 14-bit model explained in the lecture slides of week 3 (excess 16 biased exponent), convert the following numbers to binary: (10%)
   a) (12.625)
   b) (-23.25)

5. By considering CRC as an error detection method and using 1100 for the divisor, (20%)
   a) find the bit pattern that is sent to the receiver for data 1010111.
   b) Can receiver find any error in the received message 1001101001?

6. By using the Hamming code (even parity), examine the bit pattern 110110001010, when the length of data bits is 8. Has any one-bit error occurred? Which bit? (10%)
7. Write the truth table for the following Boolean function: (10%)

   $F(x,y,z) = xy + z\bar{x} + z\bar{y}$

8. Simplify the following expression using Boolean algebra and its identities. List the identity used at each step: (10%)
   $F(x,y,z)=(x+y)(x+\bar{y})(\bar{x}+z)+xz(\bar{z}+\bar{x})$

9. Draw the logic diagram for the Boolean expression $F(x,y,z)=(xz+x\bar{y})(\bar{z}+x)$ (10%)

Submission Instructions

Submit the answers in one PDF file that contains your full name and Unikey. **For each question, you must explain your solution and show how you get the final answer.** Only the PDF file submitted on Canvas will be accepted for marking. All other file types (including word files) will be considered as a missed submission (mark of 0). Late submission penalty is 5% per calendar day and after 10 calendar days late, a mark of 0 will be considered. Please mention your name inside your answer and submit your PDF file with the following name format: LastName_FirstName_Unikey.pdf