N.B. Assignments are individual work, due as pdf format. Submit through avenue, by 28th October at 11:59 PM. Your assignment should contain you name and student number and the name of the file should follow the naming convention, i.e., fistname_lastname_studentNumber.pdf.

Assignment Question 1 (6 Marks):

Using a table similar to that shown in Figure 3.6, calculate the product of the octal unsigned 6-bit integers 62 and 12 using the hardware described in Figure 3.3. You should show the contents of each register on each step.

Assignment Question 2 (6 Marks):

Using a table similar to that shown in Figure 3.6, calculate the product of the hexadecimal unsigned 8-bit integers 62 and 12 using the hardware described in Figure 3.5. You should show the contents of each register on each step.

Assignment Question 3 (6 Marks):

Using a table similar to that shown in Figure 3.10, calculate 74 divided by 21 using the hardware described in Figure 3.8. You should show the contents of each register on each step. Assume both inputs are unsigned 6-bit integers.

Assignment Question 4 (2 Marks):

IEEE 754-2008 contains a half precision that is only 16 bits wide. The left most bit is still the sign bit, the exponent is 5 bits wide and has a bias of 15, and the mantissa is 10 bits long. A hidden 1 is assumed. Write down the bit pattern to represent -1.5625×10^{-1} assuming a version of this format. Comment on how the range and accuracy of this 16-bit floating point format compares to the single precision IEEE 754 standard.

Assignment Question 5 (6 Marks):

Calculate the product of $-8.0546875 \text{ X } 10^{0}$ and $-1.79931640625 \text{ X } 10^{-1}$ by hand, assuming A and B are stored in the 16-bit half precision format described in Question 4. Assume 1 guard, 1 round bit, and 1 sticky bit, and round to the nearest even. Show all the steps. Indicate if there is overflow or underflow. Write your answer in both the 16-bit floating point format described in Question 4 and also as a decimal number. How accurate is your result? How does it compare to the number you get if you do the multiplication on a calculator?

Assignment Question 6 (6Marks):

Calculate by hand $8.625 \text{ X } 10^{1}$ divided by $-4.875 \text{ X } 10^{0}$. Show all the steps necessary to achieve your answer. Assume there is a guard, a round bit, and a sticky bit, and use them if necessary. Write the final answer in both the 16-bit floating point format described in Question 4 and in decimal and compare the decimal result to that which you get if you use a calculator.