

Lab Assignment 3

Wednesday, March 31, 2021

Question:

A maverick physicist has designed an equipment to perform automated range detection for use in the navy. He/She uses logic gates to perform all the necessary calculations. The naval officers have a doubt regarding the errors that may creep into the calculations due to decimal to binary conversions. To alleviate their fears our physicist decides to provide the specifications to the navy regarding the errors in his/her equipment. To obtain an insight into the errors encountered, he/she feeds a few decimal numbers in the equipment and notes down the converted values and estimates the errors.

Write a program to perform these conversions.

1. Design your program such that the user can input any real number between -65536 to 65536 (end-points not included).
2. Convert the following decimal numbers into binary form and back.
 - (a) 6.7 m
 - (b) 153.25 m
 - (c) 19356.17 m
 - (d) -65535.99 m (opposite direction)
3. Print the true and relative error in each case above.

Note: You may use upto 16 binary digits to encode the integer part of the decimal number in binary form and truncate the fractional part after 8 binary digits.