

ECE 8053 – Chapter 3–4 Homework – Due 9/16/03

Assignment from the Text (Parhami):

3.4 a) Hint: For the slice i use 2-bit binary encoding for input digits x_i and y_i and output s_i . Two FAs and one HA can be used to implement the digit slice. Carefully explain the operation of the circuit and how it supports limited-carry addition.

3.7 a) and b)

4.2

4.5

4.6 a)

1. Write the boolean equations for a circuit implementing the conversion algorithm presented in the “Two’s Complement/BSD Conversion” slide in the class notes. Use encoding 2 from the same notes. Point out similarities, if any, between the resulting circuit and a full-adder.

2. Divide 33 by 11 in the residue system RNS $(7|3|2)$ using the multiplicative inverse. Can you divide 33 by 3? 33 by 5? What are the conditions under which division can be easily carried out?

3. Compare $X = (1|2|3|1)_{\text{RNS}}$ and $Y = (0|3|3|1)_{\text{RNS}}$ for residue system RNS $(8|7|5|3)$ using the approximate CRT lookup method (Table 4.3). Is the comparison accurate considering the possible error?