Final examination on Logic Circuit Design (Group 2)

Christian Rinderknecht

4 December 2008

1 Addition of negabinary numbers

Question. The *negabinary* representation of a number is similar to the binary representation, except that the base is not 2 but -2. Therefore, the general shape of the negabinary representation with n bits $b_{n-1}, b_{n-2}, \ldots, b_0$ is

$$b_{n-1}(-2)^{n-1} + b_{n-2}(-2)^{n-2} + \ldots + b_1(-2)^1 + b_0$$

Devise a C function adding two numbers expressed in the negabinary system, of same length:

```
char* addNeg2 (const char p[], const char q[], unsigned int len);
```

Hint. Make the table of all the possible cases. First, start with a zero carry in and the rightmost bits 0 or 1. Then, fix the bits and carries that need fixing and discover new carries. Then add new cases until no new carry is discovered.