

CSE 123a Fall 2005

Project #1

Instructor: Stefan Savage

Project TA: Mikhail Afanasyev (mafanasyev@cs.ucsd.edu)

Due Nov 1st by 1pm via electronic handin.

Write two programs (in C) **by yourself** (this is a solo project). One, called *crcgen*, that takes a bitstream as input and outputs an 8bit CRC using the degree 8 polynomial $x^8 + x^7 + x^4 + x^1 + x^0$ (the binary string, 110010011). The other, called *crccheck*, which takes a bitstream plus CRC as input and calculates whether the bitstream matches the CRC. Each program should accept a filename as input which contains an ASCII string of 0's and 1's representing the input. The output for *crcgen* should be an ASCII string of 1's and 0's representing the calculated CRC value, while the output for *crccheck* should be the string "Valid CRC" or the string "Invalid CRC" depending on whether the string matches. You can assume that we won't provide any input longer than 300 bits (i.e. 300 "1" and "0" symbols). Here is an example of what your programs should do:

```
foo.ucsd.edu % cat input
01010101000111
foo.ucsd.edu % crcgen input
11011011
foo.ucsd.edu % cat crcinput
0101010100011111011011
foo.ucsd.edu % crccheck crcinput
Valid CRC
foo.ucsd.edu % cat badcrcinput
1101010100011111011011
foo.ucsd.edu % crccheck badcrcinput
Invalid CRC
```

Describe the logic for your two programs using good comments and test them against your own inputs and the inputs on the class Web page. If it works, your CRC should be able to detect any one bit error (i.e. changing any single bit after the CRC is calculated with result in an Invalid CRC result).

You can develop this program on any platform with a C compiler. However, you should do final testing and turning on the particular OCE computer systems we have allocated for this class (either the ieng6 linux server or the linux workstations in CSE room 240, 250, 260 or 270). Account information (as well as lab combinations) can be found at acs.ucsd.edu. If you do not have an OCE account (e.g. if you are an extension student or grad student) then I'll make sheets available to you at the Thursday class.

Final turn-in instructions will be made available closer to the due date.