CS 6001 Homework 3

Michael Catanzaro, Jacob Fischer, Christian Storer

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1 Problem 1

$(9x^2 + 3x + 5)/(7x + 3)$

		6x	+ 1	R 2
7x+3	)	$9x^2$	+ 3x	+ 5
		$-\ 9x^2$	+ 7x	
			7x	+ 5
			- 7x	+ 3
				2

$(9x^2 + 3x + 5)/(7x + 3) = 6x + 1,\ R\ 2$

2 Problem 2

2.1 Addition

$(x^5 + x^3 + x^2 + x + 1)\ +\ (x^2 + x + 1)$
$= x^5 + x^3$

2.2 Subtraction

$(x^5 + x^3 + x^2 + x + 1)\ -\ (x^2 + x + 1)$
$= x^5 + x^3$

2.3 Multiplication

$(x^5 + x^3 + x^2 + x + 1)\ *\ (x^2 + x + 1)$

$$x^5 + x^3 + x^2 + x + 1 * x^2 = x^7 + x^5 + x^4 + x^3 + x^2$$
$$x^5 + x^3 + x^2 + x + 1 * x^2 = x^6 + x^4 + x^3 + x^2 + x$$
$$x^5 + x^3 + x^2 + x + 1 * 1 = x^5 + x^3 + x^2 + x + 1$$

$$
\begin{array}{llllllll}
x^7 & & +x^5 & +x^4 & +x^3 & +x^2 & & \\
 & +x^6 & & +x^4 & +x^3 & +x^2 & +x & \\
 & & +x^5 & & +x^3 & +x^2 & +x & +1
\end{array}
$$

$$= x^7 + x^6 + x^3 + x^2 + 1$$

2.4 Division

$(x^5 + x^3 + x^2 + x + 1)\ /\ (x^2 + x + 1)$

$$
\begin{array}{r|l}
 & x^3 \quad - x^2 + x + 1 \\
\hline
x^2 + x + 1 & x^5 \qquad + x^3 \quad + x^2 + x + 1 \\
 & -x^5 - x^4 - x^3 \\
\hline
 & -x^4 \qquad + x^2 \\
 & x^4 + x^3 \quad + x^2 \\
\hline
 & x^3 + 2x^2 + x \\
 & -x^3 \quad - x^2 - x \\
\hline
 & x^2 \qquad + 1 \\
 & -x^2 - x - 1 \\
\hline
 & -x
\end{array}
$$

$$= x^3 - x^2 + x + 1,\ R\ -x$$