

Homework week 17

4.2

7) $(80E)_{16} = 1000\ 0000\ 1110$

$$\begin{array}{r} 8/2 \\ \textcircled{0} \ 4 | 2 \\ \textcircled{0} \ 4 | 2 \\ \textcircled{0} \ 2 | 2 \\ \textcircled{0} \ 2 | 0 \\ \textcircled{1} \end{array}$$

$$E = 14$$

$$14 = 1 \cdot 2^3 + 1 \cdot 2^2 + 1 \cdot 2^1 + 0 \cdot 2^0 = 1110$$

$$14 : 2 = 7 \text{ rem } 0$$

$$7 : 2 = 3 \text{ rem } 1$$

$$3 : 2 = 1 \text{ rem } 1$$

$$1 : 2 = 0 \text{ rem } 1$$

b) $(135AB)_{16} = 0001\ 0011\ 0101\ 1010\ 1011$

$$1 : 2 = 0 \text{ rem } 1 \quad 3 : 2 = 1 \text{ rem } 1 \quad 5 : 2 = 2 \text{ rem } 1 \quad 10 : 2 = 5, 0$$

$$0 : 2 = 0 \quad 1 : 2 = 0 \text{ rem } 1 \quad 2 : 2 = 1 \text{ rem } 0 \quad 5 : 2 = 2, 1$$

$$1 : 2 = 0 \text{ rem } 1 \quad 2 : 2 = 1, 0$$

$$0 : 0 = 0 \quad 1 : 2 = 0, 1$$

$$11 : 2 = 5, 1$$

$$5 : 2 = 2, 1$$

$$2 : 2 = 1, 0$$

$$1 : 2 = 0, 1$$

19) To convert from octal to hexadecimal, we first convert from octal to binary, then from bin. to hex.

27) $3^{2003} \bmod 99$

$$2003 : 2 = 1001, 1 \quad 15 : 2 = 7, 1$$

$$1001 : 2 = 500, 1 \quad 7 : 2 = 3, 1$$

$$500 : 2 = 250, 0 \quad 3 : 2 = 1, 1$$

$$250 : 2 = 125, 0 \quad 1 : 2 = 0, 1$$

$$125 : 2 = 62, 1 \quad 2003_{16} = 1111010011$$

$$62 : 2 = 31, 0$$

$$31 : 2 = 15, 1$$

$$x = 1$$

$$\text{pwr} = 3 \mod 99$$

$$x = 1$$

Bit from right $x = x \cdot \text{power}$

1	$\text{mod } 99 = 1 \cdot 3 = 3$
1	$x = 3 \cdot \text{pwr} = 27$
0	skip
0	skip
1	$27 \cdot 81 = 2187 \mod 99 = 9$
0	skip
1	$x = x \cdot \text{pwr} = 9 \cdot 81 = 729 \mod 99 = 36$
1	$36 \cdot 9 = 324 \mod 99 = 27$
1	$27 \cdot 81 = 2187 \mod 99 = 9$
1	$9 \cdot 9 = 81 \mod 99 = 81$
1	$81 \cdot 81 \mod 99 = 9$

$$\text{pwr} = (\text{pwr})^2 \mod 99 = 3^2 \mod 99 = 9$$

$$9^2 = 81$$

$$81^2 = 6561 \mod 99 = 9$$

$$6561 \cdot 9^2 \mod 99 = 81$$

$$81^2 \mod 99 = 6561 \mod 99 = 9$$

$$9^2 \mod 99 = 81$$

$$81^2 \mod 99 = 9$$

$$9^2 = 81 \mod 99$$

$$81^2 \mod 99 = 9$$

$$9^2 \mod 99 = 81$$

-

37. Algorithm 3, if carry, carry out to the left column

43. The result is automatically correct and doesn't need to carry out.