

1. Briefly describe the difference between translation & interpretation. 2pts.
2. Listed (from highest to lowest) the six virtual machine layers we used to describe a computer's architecture. 6pts.
3. List a benefit & a drawback of using rational binary. 2pts.
4. List a benefit & a drawback of using BCD binary. 2pts.
5. List a benefit & a drawback of using fixed point binary. 2pts.
6. Convert the following decimal numbers into unsigned binary & hex equivalents 8pts.

234_{10}
 88_{10}
 23_{10}
 31_{10}

7. Convert the following unsigned binary into decimal & hex equivalents 8pts.

$0001\ 0011_2$
 $1100\ 0100_2$
 $1010\ 0101_2$
 $0011\ 0111_2$

8. Convert the following signed decimal numbers into 2 complement binary & hex equivalents 8pts.

-234_{10}
 -88_{10}
 0_{10}
 -31_{10}

9. Convert the following into binary using BCD format. 2pts.

234_{10}
 88_{10}

10. Convert the following into 16:16 fixed point binary. 2pts.

3.140625_{10}
 21.00244140625_{10}

11. Perform the following long division in binary. 2pts.

$0110\ 1010_2 \div 101_2$

12. Perform the following long multiplication in binary. 2pts.

$0110\ 1010_2 \times 1011_2$

13. Perform the following logical operations. 4pts.

$0110\ 1010_2$	$0110\ 1010_2$	$0110\ 1010_2$	$0110\ 1010_2$
<u>AND $1100\ 1111_2$</u>	<u>AND $1100\ 0011_2$</u>	<u>OR $1100\ 1111_2$</u>	<u>OR $1100\ 0011_2$</u>

$0110\ 1010_2$	$0110\ 1010_2$	$1100\ 1111_2$	$1100\ 0011_2$
<u>XOR $1100\ 1111_2$</u>	<u>XOR $1100\ 0011_2$</u>	<u>NOT $1100\ 1111_2$</u>	<u>NOT $1100\ 0011_2$</u>