Print and staple these pages. Turn in your answers in class on Tuesday.

Name ______________________________

Complete the crossword below.

Across

2 1111 in decimal (word)
4 101 in decimal (word)
7 Memory cells are identified by a unique ______
9 One of the first computers
11 Invokes the Java compiler
15 Performs arithmetical calculations
16 Abstract computer implemented in software
17 Step by step procedure for solving a problem
20 Primary memory is electronic, secondary memory is ______
23 Long term memory
27 Interface between the user and the computer
29 Computer programs
30 Primary memory is ___(two words) memory

Down

1 RAM is _____: when the computer is turned off all memory is erased
3 First high level language
5 A sophisticated system for writing and compiling programs
6 Physical components of a computer
8 The "brain" of a computer
10 Translates a program into native code
12 Output device
13 A binary digit
14 Primary memory
18 Each computer speaks a unique ___ language
19 Computers store data in ____ format
21 Determines how fast hardware executes instructions
22 Java programs are compiled into ____
24 Eight bits
25 Secondary memory device
26 The Java compiler creates a file with a ___ extension
28 Input device
1. **True or False**
   Answer each of the following questions true or false.
   
   a. Retrieving data from RAM usually takes more time than retrieving data from a hard drive.
      _____
   
   b. The ALU performs arithmetical calculations.
      _____
   
   c. Primary memory (RAM) is addressable in units of one bit.
      _____
   
   d. The clock speed of a computer has nothing to do with how fast programs execute.
      _____
   
   e. The CU determines the next instruction that executes.
      _____
   
   f. An operating system is a fundamental part of the hardware of a computer.
      _____
   
   g. Executing the same C++ program on two machines with different CPUs requires two compilers.
      _____
   
   h. Bytecode is the native language of most Windows machines.
      _____
   
   i. Java is compiled directly to a machine’s native language, and then translated line by line to bytecode.
      _____
   
   j. Any computer you purchase can execute Java bytecode without any special downloading of software.
      _____

2. **Decimal to Binary**
   Convert each of the following binary numbers to its decimal equivalent. **Show your work**
   
   a. 10101
      Show your work
   
   b. 00101
   
   c. 100100101
      Show your work
3. **Binary to Decimal**
Determine the binary representation of each of the following. **Show your work.**

a. 128

b. 235

c. 66

4. **Adding in Binary**
When does $1 + 1 = 10$? When you are adding binary numbers. Addition of binary numbers is much the same as with decimal numbers. For example, decimal numbers 23 and 15 in binary format are 10111 and 01111 and their sum is calculated as

\[
\begin{array}{c}
\text{10111} \\
+ \text{01111} \\
\hline
\text{100110}
\end{array}
\]

As you see, sums are simple as long as you remember to carry a 1 whenever you add 1+1. Multiplication is just as simple:

\[
\begin{array}{c}
\text{10111} \\
\text{01111} \\
\hline
\text{10111} \\
\text{10111} \\
\text{10111} \\
\text{10111}
\end{array}
\]
Find the following binary sums and products:

a. $11111 + 00001$

b. $11100011101 + 01001011111$

c. $(111) \times (101)$

d. $(1010) \times (0101)$
5. ASCII Encoding
The ASCII code for upper case ‘A’ is 01000001 (decimal 65); the code for ‘B’ 01000010 (decimal 66); for ‘C’ it is 01000011 (decimal 67), etc.
Decode the following sequence of nine bytes:

0100101001000010101011001000010100100101010011010001100101010101001110