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| **Unit:** Basics | **Turn In List:** **1. Terms (this file)** |
| *“I will demonstrate an understanding of digital information and convert decimal, binary and hexadecimal.”* | |

**Computer Basics: Bits, Bytes and Basics**

**Content Objectives:** Students will use a modern OS to examine how information is stored and examine/convert values between the decimal, binary and hex number systems.

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| **Starter Activity** |
| Using Processing and the online reference, create the following sketch. You do not need to draw gridlines and number labels. Don’t worry about getting the dimensions absolutely perfect; rather match shape attributes and fill colors for each. HINT: you will be using rect() ellipse() triangle() and quad() functions. |

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| **Use the internet to find definitions to these Key Terms:** | |
| OS | Operating system: Windows, OSX, ChromeOS, Linux, iOS, Android |
| Kernel | Heart of the OS |
| Binary | Base 2 number system using 1s and 0s. |
| Bit and Bit Systems | Bit is the smallest unit of digital information. Bit system is how many bits the computer will process at once. |
| Byte | Exactly 8 bits of data. |
| Kilo, Mega, Giga, Tera | Kilo = 1024 bytes; Mega = 10240 KB or 1 million bytes; Giga = 1 billion bytes; Tera = 1 trillion bytes |
| Hexadecimal | Base 16 number system that uses 0-9 and A-F. |
| Base 2, 8, 10, 16 | Binary, octal, decimal, hexadecimal. |
| File and File Extension | Files must be unique to the folder, the extension gives instructions to the OS for application use. |
| Folder/Directory | Organizational unit for containing files and folders. |
| Path | Is the exact location of a file on a drive. |

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| **Application Terms:** | |
| Windows Explorer or Finder | File Manager |
| File Attributes - Properties or Get Info | Meta data |
| Size Attributes | Always measured in bytes |
| Created, Modified and Other File Attributes | System fields |
| File Compression | Used to save space and/or package files in one .zip |

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| **Assignment:** |
| Basic:   1. Students will demonstrate that they can navigate to the “Desktop” directory of their computer by typing the full path (Windows will include the drive letter): Macintosh HD/Users/jonathansu 2. Students will then create (or verify) the following folders inside the new “Computer Programming” directory, “Semester1” and paste the path here: Macintosh HD/Users/jonathansu/Computer Programming 1 3. Students will fill in the blanks in the following table (all binary results will be written in 8 bits). Use the [Binary tool](https://dl.dropboxusercontent.com/u/21278437/LearningPJS/Teacher38LearningBinarySmall/index.html) for assistance:  |  |  |  | | --- | --- | --- | | **Binary** | **Decimal** | **Hexadecimal** | | 01010101 | 85 | 55 | | 10100010 | 162 | A2 | | 11010100 | 212 | D4 | | 00111010 | 58 | 3A | | 01000100 | 68 | 44 | | 11110010 | 242 | F2 | | 11110111 | 247 | F7 |  1. Using the [ASCII table](http://www.asciitable.com), write your first and last name in binary, decimal and hex:   Binary Name: 01001010 01101111 01101110 01100001 01110100 01101000 01100001 01101110 00100000 01010011 01110101  Decimal Name: 74 111 110 97 116 104 97 110 32 83 117  Hex Name: 4A 6F 6E 61 74 68 61 6E 20 53 75   1. Create a Processing sketch meeting the following requirements and paste code below:    1. Draw an ellipse that follows mouseX and mouseY    2. Show the path as the mouse moves    3. Randomize one of the color hues    4. Randomize the size as it is dragged |
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Notes (Points of interest, mistakes, lessons learned, web resources, and thoughts):

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| void setup () {  size(600, 600);  }  void draw () {  fill(random(255), random(255), random(255));  ellipse(mouseX, mouseY, random(100), random(100));  } |