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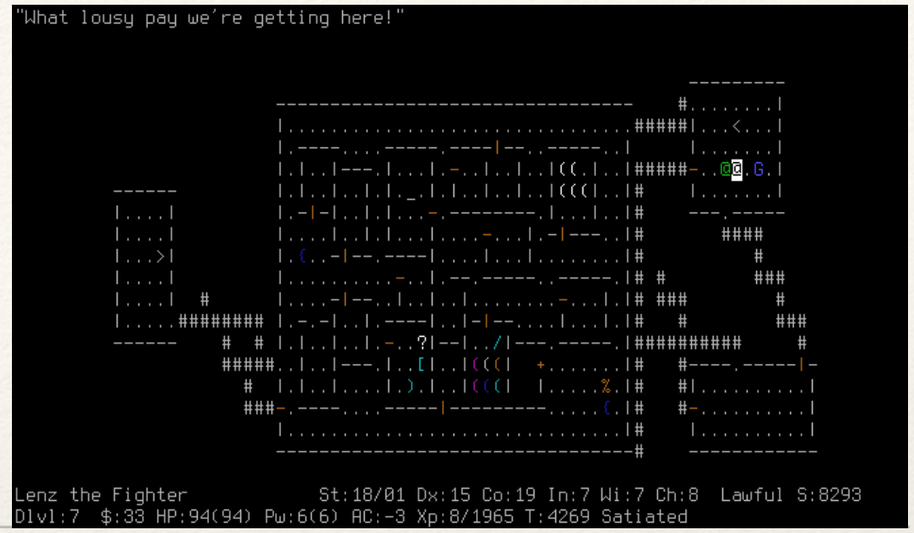

Strings and Text

Elements of Graphics
CS324e

Characters

- Primitive data types in Processing
- Assigned to variables with single quotes

```
char letter = ‘A’;
```

- Characters have corresponding ASCII value

```
char letter = ‘A’; //letter has value A

int number = letter; //number has value 65
```

ASCII Table

- American Standard Code for Information Interchange
- Provides standard for mapping characters to computer-understood numbers
- http://www.asciitable.com/
- ASCII encodes 128 characters (8-bits)
- Unicode allows for 16 and 32 bit encodings

Strings

- Data type in Processing contains words and sentences
- Assigned to variables with double quotes

```
String s = “A string”;
```

- Strings can be concatenated with the + operator

```
String s1 = “A ”;

String s2 = “string”;

String s3 = s1 + s2; //s3 = “A string”
```

String Objects

- Objects have variables (fields) and functions (methods)
- Fields and methods accessed using the dot operator
- Fields do not have parentheses, but methods do
- `length()` is a String function

```
String str = “Hello World”;

int length = str.length();  //length is 11
```

String Methods

- `startsWith()` and `endsWith()` check whether the String begins or ends with the provided parameter:

```
String s = “Hello”;

bool isTrue = s.startsWith(“He”);

//What is the value of isTrue?

isTrue = s.endsWith(“Lo”);

//What is the value of isTrue?
```

- `charAt()` returns the character at a given index

```
String s = “Hello World”;

char x = s.charAt(4);  //x now has value ‘o’
```

- `substring()` returns a String within the provided indices

```
String s = “Hello World”;

String s1 = s.substring(0, 5);

String s2 = s.substring(6);
```

- `toLowerCase()` and `toUpperCase()` return a copy of the String in either all lower or upper case

```
String s = “Hello World”;

String s_lower = s.toLowerCase();

//s_lower is “hello world”

 s = s.toLowerCase();
```

- `equals()` allows the String to be compared to the provided parameter

```
bool isTrue = s.equals(s_lower);

isTrue = (s == s_lower);
```

What’s the difference between these two lines?

Splitting and Joining Strings

- `split()` separates String into an array of Strings separated by the delimiter

```
String s = “Hello World”;
String [] subwords = split(s, ‘ ‘);
//subwords = [Hello, World]
```

- `splitTokens()` allows for splitting along multiple delimiters
- `join()` can join multiple Strings
- + operator can also join Strings

Reading Files

- Processing can read from .txt, .csv and .xml file types
  - For now, we'll focus on reading from .txt

1. Move the .txt file into sketch's **data** directory
2. Call `loadStrings()` to break each line into its own String

```
String[] lines =
loadStrings("textfile.txt");
```

Writing Files

- Writing to a file can be done all at once or continuously appended
- `saveStrings()` writes an array of Strings to a file (one line per String)
- The `PrintWriter` class appends print statements to a file

PrintWriter Example

```
PrintWriter output;

void setup() {

   output = createWriter(“outputPositions.txt”);

}

void draw() {

   output.println(“(” + mouseX + “, ” + mouseY + “)”);

}

void keyPressed() {

 output.flush();

 output.close();

}
```

Hands-on: Using Strings

- Today's activities:

1. Create a small text file "mytext.txt" and populate it with several paragraphs of text
2. Read "mytext.txt" into Processing
3. Count the length of each line and print it to the console
4. Split each line into individual words and count the number of words. Print this number to the console
5. Use the `PrintWriter` class to print out each word on its own line into a file "words.txt"