

```
' ; DROP TABLE 'portfolios'; --
```

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Spring 2013



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My beautiful reader:

The eighteenth of June, two thousand and thirteen

I can't guarantee that you'll particularly like my work. I don't anticipate that you'll appreciate my writing style very much. I can tell you that I definitely don't. That's not the point, though, because at this point you've already read a solid four sentences of my words. If you disliked them so greatly, you'd have been gone by now.

I like to pretend to be sane, but the façade is rather difficult to maintain. When you walk by me on the street or have a short conversation with me in the hallway, you hopefully leave with the belief that I am only mildly insane. This portfolio, however, contains my ramblings during those times that I was not in the mood to contain myself, and I don't suppose that your opinion of me will be favorable once you have finished reading whichever portion of this work that you intend to read.

I am glad that you are reading this, though. I did not compose it with the intent of throwing it in the garbage. I am not of the opinion that this portfolio is garbage. I want you to analyze my work. I want you to realize everything I did wrong, and I want you to judge me for it. This portfolio might well be the death of your respect for me, but I anticipate that it will be the birth of your understanding of my underlying existence.

The title of this book is a silly reference to a programming concept that I discuss on page 4 of this book. I chose it with the intent of demonstrating the lack of seriousness in the nature of the portfolio as well as my interest in programming.

I have composed a very small portion of music for each page of this portfolio. The music was probably written on a whim, though I intended to portray through the music the emotion that came out while I was writing the text. I wrote some of this writing, like my thesis paper, with the intent of being emotionless. In some instances, I capture this lack of emotion by writing little more than a major scale on the page. In others, I free myself from the text and compose whatever music I'd like to compose.

I have recorded each slice of music on whichever instrument pleased me. You can access the recordings by navigating to the online version of this portfolio, which you are able to access at <http://timothyaveni.com/portfolio>.

I should warn you that there might be some inconsistencies with the spelling conventions I use for words. In casual situations, I tend to use British English in most of my spelling. My teachers dislike that, and prefer that I use American English. I have tried to eradicate most of the British English in this portfolio in favour of American English, but I cannot guarantee perfection.

You might also wish to note that the page numbers in this portfolio start at 0, and are written in hexadecimal. I trust that you will not find this too confusing, because you seem to be a pretty intelligent person so far. If you're not already familiar with the system, you will pick it up quickly. I am using hexadecimal numbers because I am a programmer, and I wanted to pretend that I'm a creative fellow.

Yours,
Timothy Aveni



The Author

Timothy Aveni, born on the fifteenth of February nineteen ninety-eight, is a young male who has found himself in an interesting position. He is respected by those around him, though he is not a particularly kind fellow. He prefers to avoid interacting with others when he can, with the exception of a few close friends who do their best to keep him sane. Still, Timothy finds himself content when he is alone, and is willing to spend as much time as is necessary to gather his thoughts away from others.

In his spare time, he programs. He loves lots of different sorts of programming, so he is never bored. He frequently explores new programming concepts, professing their greatness (or lack thereof) to anyone who will listen. His interest lies in computer science, and he interests himself specifically in the construction and population of neural networks.

He greatly enjoys playing, singing, and creating music, no matter what mood he is in. He plays his trumpet in the wind ensemble, though he enjoys playing his flute just as much. He is not a particularly good singer (don't tell him, though), but he will loudly sing whatever song is in his head without shame.

His lack of reluctance to make himself look silly is what brings success forth to him. In eighth grade French class, when tasked with presenting a poem in front of the class, he fitted a tune to the poem and sang the entire thing. He is not obsessed with identifying as an outcast, but he will violate convention when it does not suit him. He prefers to think through his actions before executing them, and occasionally finds himself in opposition to those around him. He doesn't really mind. He just kind of does whatever he wants.

Timothy is a pretty happy guy.

Dedication

There are a lot of people to whom I *should* dedicate this book; its dedication belongs to teachers, those whom I love, those who love me, and those who have helped me. I have dedicated this portfolio to none of those people.

No, I dedicate this book to a concept. You might think that this is cheating or disallowed, but I argue that nothing in our minds is more than a concept. I have seen people dedicate books to their God; is this God not a concept, as well?

I hereby feel completely justified in dedicating this portfolio to freedom. In this sense I do not mean personal freedom, as in the freedom to spontaneously jump into a lake, or economic freedom, as in free tacos, or independence, which allows one to be free of restraint. I refer specifically to the freedom granted by one party to another that gives permission to use content in a specific manner, as in Free Open-Source Software.

For the sake of this freedom, this book is licensed under a Creative Commons Attribution Non-Commercial Share-Alike License. Perhaps this is not the perfect "free" license, and it certainly places restrictions on the redistribution of the content. Still, I think that it is sufficient for most of the purposes that anyone wishes to use the content for. If you'd like more rights to the content, you can contact me and we can negotiate.

me@timothyaveni.com



Dear Ms. Ettenhuber and Mr. Petrushun,

18 June 2013

I should thank you for forcing me to consider concepts that I had not considered and for teaching me things that I had not yet learned. I can say with little doubt that of all the courses I took this year, I have put the most thought into the two humanities classes. Humanities has an amazing nature of forcing a person to actually consider the connections among topics and the implications of individual ideas. I am thanking you for this thought that the two of you provoked. My experience in my first year of high school would not have been nearly as contemplative without your help.

The philosophy lessons prompted by *Sophie's World* were painful. Perhaps I feel this way because of my tendency to retain my philosophical thoughts rather than share them in a group. I think philosophy should be an internal journey of thought. I think of it as a depth-first search of concepts: inquiries should spark more inquiries, and this path should not be fragmented or interrupted by the tendency of the group to move on. I have made a lot of personal progress in my thoughts throughout the year, as I do every year, but almost all of that progress was made outside of the context of a group philosophy session. For this reason, I think philosophy in class would be better suited to a private session of thought, with the teacher's role being just to plant a few seeds at the beginning of the session to help direct the students. Revelations would need to be recorded silently on paper. This is not a great solution, because a class like this would be arguably unproductive in a humanities setting. Truthfully, I do not believe that philosophy, whether silent or as a group, is suited to this sort of classroom environment.

Relative to some of my other teachers (whose names I won't disclose), I was always impressed with how well-prepared your humanities lessons were. History lessons always had concise slideshows associated with them that gave just the right amount of information. Explanations of the causes for certain historical events were always intuitive, and everything was built off of previous knowledge. It always seemed like each lesson was part of an overall structure and flow of information as opposed to fragmented pieces. To explain specifically why this is important, I will note that another of my teachers this year often teaches the same content multiple days in a row, without adding a single piece of new information on the subsequent days. This teacher often spends the first ten or fifteen minutes of class searching for suitable slideshows or videos to show us. The preparedness that is expressed by the success of these humanities lessons is important.

I suppose I simply appreciate your passion for teaching. There are too many teachers in the field who do not share such a passion, and it is important for a teacher to be able to bestow this sort of passion upon his students. I have found myself interested in the most unexpected of topics just because my teachers were truly engaged in their topics. It is vastly easier for a student to learn when he is exposed to people who love the content that he is trying to learn. Humanities never felt dull. Whether it was excitement about guillotines during the Reign of Terror or enthusiasm about the importance of grammar, there was always a true display of passion for the topics that you were professing.

Yours,
Timothy Aveni



Writer's Notebook: SQL Injection

24 March 2013

SQL injection is an interesting sort of software vulnerability. It is relatively common in websites, and I've actually found a few vulnerabilities myself that were based around SQL injection.

Let me start by describing SQL. SQL, or Structured Query Language, is a language used to store and retrieve data in databases. Each database can have multiple named tables. Tables have multiple named columns. Tables can then have entries (rows) inserted that use the columns as their definition.

For a website, I might have a table called "users" with columns "username", "email", and "password". "password" would likely not be stored in plain text, but rather in a hash. For more information about hashes, refer to MP2 page 13 [in this portfolio, that's page 1B].

To insert a new user into the "users" table, I'll write:

```
1 INSERT INTO 'users' VALUES('george', 'george@gmail.com', 'a5de69f4');
```

When a website gets a hit for the "create user" page, it might run some code like this:

```
1 userName = userInput("username")
2 passWord = userInput("password").hash()
3 email = userInput("email")
4
5 query = "INSERT INTO 'users' VALUES('" + userName + "', '" + email + "' ,
'" + password + "');"
6 mysql_execute(query)
```

This would take user input and shove it into the database. Remember this code example, because it is important.

To obtain data from a database, I write:

```
1 SELECT * FROM 'users' WHERE username='george';
```

Which will return with a row that contains George's username, email, and hashed password. I can use similar code as before to dynamically form any SQL query.

Another thing I should mention now is the concept of SQL 'comments'. When the combination of characters "--" is located somewhere in an SQL statement, everything after the "--" is not executed. This is useful for writing comments in SQL without throwing an error. This:

```
1 SELECT * FROM 'users'; hi I like tacos
```

would give an error, because "hi I like tacos" is not valid SQL. This:

```
1 SELECT * FROM 'users'; -- hi I like tacos
```

would not, because everything after -- is ignored.

An attacker can use these concepts to his advantage.

Imagine a "log-in" procedure in your code that goes like this:



```

1   userName = userInput("username")
2   passWord = userInput("password")
3
4   query = "SELECT * FROM 'users' WHERE username=' " + userName + "' AND
password=' " + passWord + " ';" 
5   mysql_execute(query)

```

The code just inserts the user's username input and password input into the SQL statement. Say I wanted to log in with username "george" and a password hash of "ef6dbe3". The statement would look something like this:

```
1   SELECT * FROM 'users' WHERE username='george' AND password='ef6dbe3';
```

If the username exists in the database, but the password is WRONG, the SQL statement will not return a user row- there is no row that exists in which the username is 'george' and the password is some random, incorrect hash.

Think about this. What if an attacker were to enter this:

`george';--`

into the username field, and leave the password field blank? Go on, think about it.

The resulting statement is devious:

```
1   SELECT * FROM 'users' WHERE username='george';--' AND password='';
```

After the SQL comment is applied, that will evaluate to:

```
1   SELECT * FROM 'users' WHERE username='george' ;
```

Now you don't even need a working password to log in! If you can sneak it by the website, you can log into anyone's account. Worse, imagine this input:

`'; DROP TABLE 'users';--`

Which evaluates to:

```
1   SELECT * FROM 'users' WHERE username=''; DROP TABLE 'users' ;
```

Heh... there goes your entire table of user accounts.

Prevention of SQL injection attacks is easy. First, databases generally support individual database access accounts with different permissions. Create a user without the "DROP TABLE" permission, and at least your tables will be okay.

It's also possible to "sanitize" your input strings to safely be added into SQL without the possibility of code execution. That's not the best solution, but it's rather popular in basic websites.

As much as I'd love to pretend I'd like writing, I've hit the twenty-eighth page. Goodbye until the fourth marking period.



Writer's Notebook: Grammar

31 October 2012

I don't pretend to be perfect with grammar.

Well, sometimes I do.

But grammar is important to me. It's what enables any language to *work*, and when people don't bother with it, I get frustrated.

First, I want to do the fun bit. I'll write out some grammatical problems that I see often, and attempt to categorize them. I'll probably get messy pretty quickly.

who/whom

status: error

It's not that hard to do. We *know* how to identify subjects and objects, and we do it *all the time* when we use the words I, me, he, him, she, her, and so on.

In French, the subjective form of "you" is "tu", and the objective form is "toi". The subjective AND objective forms of "who" are "qui". Yet you don't see people confusing "tu" and "toi" in French. Feel free to argue that "you" is used more often than "who", and feel free to be pretty much wrong, while you're at it.

<http://is.gd/pojiji>

"Whom" was dead in English long before the magical "you" burst of 1980.

The data for French is *very* skewed, because the word "qui" is used very often, like in this sentence fragment:

cette chose qui a resté

this thing which has rested

The French data is therefore not worth presenting.

My point is, if that dumbass who decided we reject "whom" had just kept to himself, the world would have been a better place.

"to be"'s funky behavior

status: error

We've discussed it in class, but some people just don't care.

"To be" will *never* have objects associated with it.

valid **invalid**

who am I it is me

it is I/I am it I become her

She becomes we She became me

I will become he

It's simple, but ugly.

improper use of "all" or "every"

status: annoyance

All grammatical problems are not errors, but they all still annoy me

WHAT IS THIS?!?

What the sentence was *trying* to portray (because I can't blame you for not understanding it at *all*) was something along the lines of "Not all grammatical problems are errors, but they all still annoy me."



Instead, the sentence manages to portray that EVERY SINGLE problem with grammar can be safely classified as NOT being erroneous.

HOW do people mess this one up so often?! It drives me INSANE.

This next one is pretty insane.

I just finished reading *Catching Fire* after being pressured by my acquaintances telling me it was good (it wasn't), and apart from not finding the word "whom" once in the book (though it really needed it in LOTS of places--my dad thought I was going insane every time I shouted "WHOM!" at my book-- and he wasn't all that incorrect), I found a very interesting sentence (I'm also going to write the preceding sentence for the sake of context):

Everybody offers to guard while the others rest, but in the end, it's Johanna and I who stay up. Me because I'm really rested, she because she simply refuses to lie down.

Did you see that?

Because it was really saddening.

I honestly don't even care about "me". Yes, it's wrong, but so were half the instances of the word "who" in the book. The second sentence *should* have started with the word "I".

Okay, got that.

But *why*, in the name of all that is good (and a substantial amount that is bad), did the author decide to SWITCH halfway through the sentence?

I can understand writing

Me, because blah blah, her because more blah blah.

because you're at least using two *objects* - two wrong words.

But what could possibly have possessed the author to use an object in the first half of the sentence, then come to her senses and use a subject for the second half?

You'd have to be *trying*.

Perhaps Suzanne Collins was.

Honestly, these grammar things are hurting me on the inside. Making me sad.

Reflection on Grammar:

Looking back on this is kind of funny. I'm not as obsessed with grammar now as I was when I wrote this, mostly because I've realized that nobody will ever actually care. As it turns out, people do not particularly appreciate it when they're constantly corrected on their improper use of the word "who". Oops.

I refuse to let myself commit such terrible atrocities, but I no longer correct others on the problems that they tend to have with how they use their words. Their crimes against our already-ugly language are not mine to observe. I was not born to bring justice to the world of grammar usage. I have found other purposes in my life.

But come on, Suzanne Collins. Her editor has problems, too. If you're going to make the (stupid) stylistic decision to completely ignore the existence of the word "whom", go ahead and do it. But it's *not* okay to make such blatant errors in the middle of your writing. That's the sort of thing that editors are supposed to catch.



Commentary on RSA Encryption:

If you're not looking to read about Internet security, you can go ahead and skip this section.

I really like 'teaching' things in my writing. Most of the thought that I do is prompted by explaining concepts to others, or at least to imaginary friends. The problem with this is that if I'm in the middle of teaching something to someone and I suddenly make new revelations, they get angry with me for interrupting the instruction. This is why imaginary stupid people are useful. I can explain things to them all day and they never get annoyed.

"RSA Encryption" is about RSA encryption (duh) in specific, which allows for secure communication on the Internet. It's pretty cool, which is why I wrote about it. The math for it is even cooler. Something I really like about the collection of writer's notebook entries that I have collected over the course of the school year is that I can use these documents to explain concepts to people. I normally don't write guides of this nature because I don't like writing in general. When I'm forced to write, though, it makes perfect sense to write about something that interests me. I've successfully explained RSA encryption, SQL injection, and a few other concepts by pasting writer's notebook entries.

Writer's Notebook: RSA Encryption

22 December 2012

I survived the end of the world, so I suppose I need to finish writing my pages. People always get annoyed when I explain security concepts to them. Part of the reason is that I tend to interrupt myself a lot, going deeper and deeper into a topic.

You're essentially obligated to read this, though. So... HA!

I'd like to write about public- and private-key encryption.

RSA encryption is all about communication. There are primarily two factors to secure communication:

- Privacy, which ensures that only the intended recipient can read the message.
- Authentication, which allows the recipient of a message to verify the sender's identity.

RSA provides both of these, and is very simple to use. I'm not going to write down the intricacies of the math, because I don't actually have them memorized. They're very cool, though, and are accessible on the Internet.

To use RSA encryption, you must have two *keys*. The keys are intertwined, and they are dependent on each other. It is not possible, however, to find one key with only the other.

These keys can be represented in a few different ways. In reality, they're just really large strings of ones and zeroes. *Anything* on a computer can be represented like that, of course. The keys can also be expressed as long numbers, or hexadecimal numbers, or base-64 numbers. It doesn't really matter how the keys are expressed, but in reality they're nothing more than large numbers.

The two keys are *public* and *private* keys. Predictably, the public key is meant to be shared with the public. The private key is only meant for the person who generated the keypair.

When a 'message' (which is also converted into a number) is encrypted with a public key, the ciphertext can only be decrypted with the corresponding private key. In the same way, a message encrypted with a private key can be decrypted only with the corresponding public key.

This is a basic principle in RSA encryption, but it is very powerful. I'll use Alice and Bob as



my characters for examples, as is the standard for encryption lectures.

Alice writes a message, encrypting it with her *private* key. She sends the ciphertext to Bob.

Bob knows what Alice's public key is- after all, it *is* a "public" key. Bob, upon decrypting the ciphertext with Alice's public key, can verify that, since the message decrypts properly with Alice's public key, it *MUST* have been encrypted with her private key. That bit represents authentication.

Alice, in another example, encrypts her message with Bob's public key. Nobody can read this message without using Bob's private key to decrypt it.

That part represents privacy.

RSA involves the *combination* of the two. Encrypting a message with your own private key *and* the recipient's private key lets the recipient verify that it's you, *and* it also ensures that only the intended recipient will receive the message.

→ What's the point, though? Why do we need to encrypt messages? Who is going to read them, or, even worse- modify them?

Eve, named as she is for her presence as an eavesdropper, is tapped into your Internet connection. She might be the government, or your Internet Service Provider, or some shady guy who plugged a cable into your router. Eve can

READ information sent, and can

CHANGE information sent.

When you send info in plaintext, you make Eve's job really easy.

But when you use RSA, Eve is pretty much screwed.

Now, though, you must learn about (wo)man-in-the-middle attacks.

How will I tell you what my public key is? Using the Internet?

Laughable.

I'd be sending that info in plaintext. After all, if we already had a secure channel of communication, we wouldn't need RSA. If, hypothetically, there was an Eve who could read but not modify the stream, there wouldn't be anything to worry about- after all, you ARE sending a "public" key. The problem, though, is that Eve generally has the ability to change information.

This is the scenario I'd like you to imagine.

Bob, a naïve message-sender, sends his public key to Alice in plaintext. Along the way, that message gets replaced with Eve's public key. Whenever Alice sends Bob a message, Eve intercepts it. She can read it, because it was encrypted using her public key (unbeknownst to Alice). Eve, who knows Bob's public key, resends the information to Bob seamlessly. Using an automated process, the additional latency is not noticeable.

Eve also now has the ability to send messages as Bob! If she uses her private key to encrypt messages, Alice will think the messages came from Bob.

Man-in-the-middle attacks highlight the primary flaw of almost any sort of encryption: The two people who are communicating *MUST* use a secure channel at least once.

Still, how can you trust anyone you meet at all? If you want to speak to someone in the first place, you must have some sort of trust that they are who they say they are. If you want to speak with someone you've met in real life, you verify their identity by talking to them in person.

So, there's your solution. Exchange public keys in person. It's as simple as that.



Hell, why not have a key party? That's what they did in *Little Brother*. And it worked!

As long as you have a *trusted* network of people, you can later exchange keyrings with others over the Internet. If Bob went to a party and got Carol's public key, Alice can receive Carol's public key (assuming Bob has good intentions) through an already-secure channel that's been established with Bob.

At a workplace, if all of the local computers are trusted, they can share keys with each other. This is used often in practice, especially when sending email. Email is an insecure protocol, and anyone can pretend to be anyone else (sometimes I pull *hilarious* (trust me) pranks using this concept). RSA encryption allows people using email to verify others' identity. RSA is also used in https and SSH. It's pretty widespread, and I love it.

There you have it.

Writer's Notebook: Acronyms

13 January 2013

I like coming up with acronyms for things. Acronyms help me remember things, and they're often pretty funny. Sometimes I'll have problems keeping track of items I'm trying to recall. A nice jog of my memory is all it takes to fetch the information.

Take the eight characteristics of life as an example:

- | | |
|------------------------|--------------------------|
| - adaptation over time | - made up of cells |
| - reproduction | - growth and development |
| - homeostasis | - responds to stimuli |
| - uses energy | - exhibits organization |

I wanted to remember these characteristics.

Do you think that I'll ever forget that CHAD is SORE?

I'll spell it out for you, in case you don't get it...

cells/homeostasis/adaptation/development/stimuli/organization/reproduction/energy

It's as simple as that.

I also like SNORF for the Enlightenment. FRONS works, too, but SNORF sounds funnier.
secularism/naturalism/optimism/rationalism/freedom

Our Biology teacher gave us "CHNOPS" to remember the six elements that are important in organic compounds. If you allow me to repeat oxygen, I can give you

PONCHOS.

Beat that.

No, really. Try it. It's fun.

Reflection on Acronyms

Try it for yourself. Mr. Petrushun did. He wrote:

"SCHNOP... just sounds funny. ...like quickly skidding towards a stop."

I made it through a lot of the school year using acronyms. It's surprising how helpful they really are, and you don't realize it until you really think about it. I've scribbled more of these silly acronyms in the margins of my tests than I can count. It's frustrating to know that though my mind has all of this information, I can't retrieve it until I enumerate it or assign letters to it. Unless I can count on my hand which terms I've already used, and assign each one to a number, I have a lot of trouble remembering things. For the same reason, I couldn't tell you the name of each person in any of my classes. Brains are funny that way.



Writer's Notebook: Progress

13 June 2013

I stand on this path and continue this stroll
 I walk and I reach for this infinite goal
 The world is below me, around me, above
 I seek this acceptance, and wisdom, and love
 The path is not tactile; my movement is free
 I fly to and fro, retaining my glee
 I must keep my bearings, and maintain my ground
 The enemy's gate will forever be down
 If I let myself drift, and I stray from the plan,
 I might never find the path where I began
 But why is this wrong? I won't disappear.
 I branch off a bit, there's a path over here.
 I see many paths. I become quite distressed;
 The path I was on might not be the best.
 But this was my fate; the path with the key:
 The path that the others had chosen for me.
 But how can I live, if away from the light?
 Perhaps this is wrong. But if so, what is right?
 I cannot remain on the path without choice.
 I'm living my life; I have my own voice.
 I'm sure of it now; from the path, I must break.
 The problem still stands; which path do I take?

Reflection on Progress:

It feels like I'm cheating. I don't actually feel this way at all. Truthfully, I think my life is going in a great direction. "Direction" was the real inspiration for "Progress"'s title.

I wasn't just writing out meaningless words when I wrote the poem, though. I certainly understand the feeling that goes along with the poem. On a much smaller scale than the narrator of the poem, there are a lot of options open to me, and I'm not sure exactly which one I should take. Still, everyone feels that way... right?

The narrator of this poem has no idea what he wants to do with his life. I have a pretty good general idea; I only have to face small decisions along the way. I suppose that's what's interesting about the 'branches' that these paths take. Each path branches into infinitely more smaller branches, and any decision you make in your life, no matter how small, will lead uniquely to more decisions. Nobody lives their life the same way as someone else, and this is because of the branching of paths.

The course that one's life takes is not based solely on the paths taken; it is more like a function of the branches traversed and the path on which one started out. Really, your starting position is more important than anything else that comes into play. There are certain things that you *simply cannot do*, ever, in all of your life. That's because you were put on a certain path by those who put you into existence; this is your parents, speaking literally, or some Creator, if you keep such a concept internally.

Eh. I guess that's just how it goes.



A letter to Mr. Weiss

14 March 2013

though apparently he's a Dr. now.

Kevin Weiss:

The smug look on your face is too much. It will stick with me until I lie in my grave, and I'm not entirely sure that the image will part with me even then. Your disgusting style of interacting with those around you sticks with me and has changed me greatly as a person.

The emotional scars you bestowed upon me have mutilated my own personality, halting my social life and making me one of the cruellest person whose existence I recognize. You taught me, as a young, impressionable sixth grader, that it was acceptable to draw in (and feed upon) the hate of those around me.

That's exactly what I ended up doing. I entered sixth grade optimistically. I aimed to have everyone love me and appreciate my presence. You derailed my attempt before I had a chance to start them. By the end of sixth grade, I was terribly apathetic- and I was *happy about it*.

I haven't recovered. I want you to think strongly about the fact that, prior to this school year, I didn't have a single friend. Even now, there are very few whom I actually trust. Trust is a large portion of my problem. You destroyed my potential to trust anyone around me. That doesn't particularly matter, though. Nobody wants to be around me, while I am as cruel as you have molded me to be.

My social situation now is fragile. It's entirely your fault.

Of all the people in the world, throughout all of history, you are the person whom I hate the very most. You are a horrible, pathetic human being, and I hate you.

Timothy Aveni

I can't stop here. I have more things to say.

Maybe I haven't emphasized it enough. I probably have, but I want to make this REALLY damn clear- you completely ruined me emotionally and socially during sixth grade. On two (and only two) first days of school, I cried for hours after the school day was over. Sixth grade, because you had been brought into my life, and seventh grade, tears of joy that I would never be forced to look at you again.

Reflection on "A letter to Mr. Weiss"

Well damn. I was pissed. Rightfully so, I'd imagine. I haven't stopped hating that guy, and I certainly don't intend to. Keep in mind that, when I said "throughout all of history", I had some of the worst people in the history of the world in mind. Think of people who effected genocides or the worst terrorists out there. I have not felt hatred for anyone with such passion as I have hated Mr. Weiss. I even made a grammatical error ("making me one of the cruellest person") in the writing, which I almost *never* do. I was ANGRY.

My social life has improved since I wrote this, and it has only been a couple of months. I'm noticing significant growth in the rate at which my social life improves, and it really only started this year. Did it really take *three years* for the pain that Mr. Weiss put me through to cool down? That's scary. No one should be able to have that sort of effect on others. Ever.



Thesis Paper

29 April 2013

An Analysis of the Similarities Between the Industrial Revolution and the Information Age

Before the propagation of innovation as effected by the English Industrial Revolution, markets were isolated in their towns, messages were carried by couriers along cross-country routes, and people communicated infrequently outside of their small, tightly-knit communities. The Industrial Revolution brought forth the telegraph and mass-production, greatly diminishing the relevance of extensive mail routes and tediously handmade goods. This time period was the source of the evolution of technology in the world that resulted in modern industrial practices. The Information Age expanded upon these new inventions, enabling near-instant communication among people across the world, creating a responsive global market, and bringing forth upgrades to manufacturing techniques. The invention of the Internet affected every industry, bringing people together and eliminating the need for physical interaction. The Industrial Revolution and Information Age both created new financial opportunities for individuals, improved accessibility of long-distance communication, and greatly changed the state of the economy.

The period from 1760 to around 1830 marked the Industrial Revolution of England. According to Joseph A. Montagna, a researcher of the Yale-New Haven Teachers Institute, the period started with the spinning jenny invented by James Hargreaves, which allowed the operator to spin many threads at once (Montagna). This was the beginning of the industrialization of the textile industry, which made textile production significantly more efficient. Montagna also writes about improvements to the iron industry that reduced the usage of charcoal when smelting, which was effective in preventing depletion of England's forests (Montagna). This improvement to the process of smelting iron made it easier for iron workers to obtain the raw materials that they needed. One major focus of the The Industrial Revolution was making production more efficient. As Lewis Hackett of the International World History Project articulates, "The worker at a machine with 100 spindles on it could spin 100 threads of cotton more rapidly than 100 workers could on the old spinning wheels" (Hackett). Factory owners could effectively pay for fewer workers, and still improve the productivity of their factories. This was the basis of most innovation in the Industrial Revolution.

The Information Age, marked by the creation and popularization of the Internet, started in around 1985, during the maturation of the Internet. The Information Age has not yet resolved, and the Internet continues to have a significant impact on people's daily lives. The Internet started as a useful tool for bringing remote people together. J. C. R. Licklider and Robert W. Taylor, two computer scientists who were present during its initial development phases, collectively noted that, given a small set of people who can solve a problem, "[these] people must be brought into close intellectual partnership so that their ideas can come into contact with one another. . . . Let them go their separate ways, and each creates his own empire . . . There has to be some way of facilitating [communication] among people [without] bringing them together in one place" (Licklider, Taylor 29). Bill Stewart, an unaffiliated researcher who specializes in the early stages of the Internet, explains that "[t]he ARPANET was the first wide area packet switching network, the 'Eve' network of what has evolved into the Internet we know and love today" (Stewart). The ARPANET was the first network that, rather than having a single intelligent server and multiple "dumb" terminals, involved multiple computers switching packets amongst each other. This method of communication



allowed any two nodes to easily interact with each other, which is still the basis of all communication that takes place on the Internet. Stewart states that the ARPANET was initially only made up of four nodes, but it eventually expanded to over one hundred nodes before it gave way to newer implementations of the Internet in 1990 (Stewart). The Information Age, and, more specifically, the Internet, created a means of communication that guided modern global industrialization and economic fluidity.

The Industrial Revolution and the Information Age both created new financial opportunities for individuals. Gregory Clark, an economic historian at University of California, Davis, writes in his book, *A Farewell to Alms - A Brief Economic History of the World*, that “[t]he Industrial Revolution was driven by the expansion of knowledge. Yet, stunningly, unskilled labor has reaped more gains than any other group. . . . Thus modern growth, right from its start, by benefiting the most disadvantaged groups in preindustrial society, particularly unskilled workers, has reduced inequality within societies” (Clark 272-273). Because laborers in factories of the Industrial Revolution did not need to be skilled with a particular craft, workers with little knowledge of their industries could still find work on assembly lines in factories. The Information Age takes the spread of opportunity in another direction. Pamela Parker, a journalist who is often involved with Internet marketing, reports that “[t]he Interactive Advertising Bureau (IAB) has released a study showing that the ad-supported Internet is responsible for 5.1 million jobs in the U.S. and contributed \$530 billion to the economy in 2011” (Parker). Individual bloggers or website owners can make ad revenue off of their websites, outweighing the costs of maintaining the websites. This revenue has a big impact on individuals’ lives, providing a new source of income, either in addition to another job or as a full-time job itself.

Both of the time periods provided openings for individuals to find jobs that they would not have otherwise been able to obtain. Uneducated factory workers did not have other methods of supporting themselves, because their lack of skill prevented them from finding jobs. Since public education was essentially unheard of in England until after the Industrial Revolution, unskilled workers did not have easy means of acquiring the knowledge that they would need to find jobs. Owners of small websites during the Information Age do not need much experience to maintain the websites. There are many tools available that make it easy to set up a blog or video channel with only the ability to write or record content. Ad revenue also funds larger companies that will use their profits to hire new employees. The Internet, as Pamela Parker reports, is the collective source for 5.1 million jobs in the United States. Both uneducated factory workers and unskilled bloggers benefit from the time periods they live in, because they can be productive and provide for themselves even without the expertise that would otherwise be required of them.

Both the Industrial Revolution and the Information Age improved the accessibility of long-distance communication. Victor Jones, a professor at the School of Engineering and Applied Sciences, Harvard University, writes about “a complex telegraphic system, based on an electrochemical current, [that] was designed and demonstrated before the Munich Academy of Science by Samuel Thomas von Sömmerring (1755-1830). . . . At the receiving end each wire is connected to one of a series of thirty-five electrodes that are immersed in an acid bath. Completion of the circuit caused the evolution of bubbles of hydrogen at the electrode corresponds to a particular letter or a number” (Jones). Though it does not share many characteristics with later telegraphs, this telegraph, built in 1808-1810, was one of the first ways to quickly send messages across distances of



a few miles. A couple hundred years later, the Information Age birthed communication protocols like Skype that let people interact with each other using voice and video with very low latency. Neville Hobson, a professional in entrepreneurial communications, writes in a blog post that “[t]here’s little doubt that Skype has been the agent of change, the architect, the [disruptor], for millions of individuals and organizations large and small and how they all communicate and connect with others more simply and easier today . . . and at measurably lower cost” (Hobson). Indeed, one-on-one communication methods impact both personal relationships and affiliations among large organizations.

Before the Industrial Revolution came about with its innovations in telegraphy, messages had to be physically carried to their recipients by messengers. The Internet improved upon the immediate communication that the Industrial Revolution provided by allowing audio and video, rather than just text-based messages, to be sent instantaneously. In between the Industrial Revolution and the Information Age, telegraphs became more advanced and, instead of operating with bubbles of hydrogen in acid, started to present messages as audible beeps for the messages’ recipients. Telecommunication has a history of constant improvement, evolving all the way from pigeon carriers to realtime video. The Industrial Revolution and the Information Age were two crucial stepping stones in the path that long-distance communication has taken over the course of its history.

The Industrial Revolution and the Information Age were both important catalysts for great change to the state of the economy. The Industrial Revolution is widely perceived to be one of the primary sources of capitalism. Kent Webb, a researcher at International School, writes that “[i]ncreasingly after 1500 in Europe, . . . banks were established, modern bookkeeping procedures were developed, and older systems of inherited economic status were loosened. After 1800, new populations of urban workers had to work for money to buy food and shelter” (Webb). Capital quickly became the primary measure of wealth and status in society, and this was largely because of the status and capital wealth of factory owners during the Industrial Revolution. The Information Age furthered the spread of global capitalism by increasing the fluidity of the global stock market. Noshua Watson, a Research Fellow at the Institute of Development Studies in the Globalisation Team, wrote a report on the impact of the Internet on stock trading in which she explains that “[w]ithin 18 months of the initiation of Web trading, Web transactions had grown to approximately 60 percent of all transactions. The total trading rate of participants . . . had quadrupled from its pre-Web level” (Watson). This increase is an indicator that Internet stock trading had a large impact on volume in the stock market.

The Industrial Revolution put heavy focus on the monetary wealth of individuals, pushing factory owners forth in society and forcing middle- and lower-class workers to work for money and use their funds to support themselves, as Webb mentioned. This is a major part of capitalism, and the Industrial Revolution promoted it through the societal and hierarchical changes that came along with it. The Information Age contributed to another portion of capitalism, specifically free market capitalism, by increasing the responsiveness of the global stock market. Economies are fluid on the Internet, and trading can be done instantaneously and automatically. The ease of trading on the Internet, according to Watson’s research, increased the popularity of stock market trading in the general population. The Industrial Revolution and Information Age were, in this sense, both very important in popularizing their respective parts of economic change.



The Industrial Revolution and Information Age resemble each other from a variety of viewpoints, and they were actually very similar in their contributions to society. The contributions can be attributed to collective innovation from many brilliant inventors, and can all be described as large societal changes that greatly affected the entire populations that they respectively encompassed. The changes that these time periods made all had economic impacts on a global scale. The Industrial Revolution and Information Age brought financial opportunities to individuals who would not have otherwise had such success, creating jobs for these people. Both time periods increased the availability of long-distance communication, encouraging economic discourse and active interaction. The global economy was also greatly changed by the two time periods, and capitalism's progression was reliant on the innovations brought forth by both the Industrial Revolution and the Information Age. Individual inventions were brought together in both time periods to create significant changes in society. The Industrial Revolution and the Information Age are, through the changes that they brought forth, very similar.



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Critical Lens Analysis: *Girl With a Pearl Earring*

25 February 2013

Gender-related stereotypes are prominent in today's society, and they have been a large part of society for as long as the two genders have been separate. Stereotypes leak into literature produced by authors from cultures affected by them, and can also find their way into literature written about those cultures. *Girl With a Pearl Earring* by Tracy Chevalier and *The Three Musketeers* by Alexandre Dumas, set in the 1600s, both include important stereotypes that existed during the time period of the setting, as well as the time periods of the respective authors. They can both be examined for their references to gender and how gender is dealt with in the books. Women tend to be referred to as weaker, and they often don't have as much standing in their family as men do. They are also often portrayed to be more emotional than men. These stereotypes tend to show great hierarchical and behavioral differences between men and women, and they are reflected in both books.

The Three Musketeers tells the story of a young nobleman, d'Artagnan, from a poor family as he leaves his house and progresses into the world. When he departs, his father gives him a letter for his father's friend, Monsieur de Tréville, who is the commander of the King's Musketeers. D'Artagnan stops in a small town and instigates a fight, after which the letter is stolen from his unconscious body. After promising to avenge the letter's loss, he sets out to Paris only to be rejected by Tréville. As he leaves the commander's anteroom, he attracts negative attention from three prominent Musketeers: Porthos, Athos and Aramis. The four men bond after working together to duel their rivals, and the story goes on to recount their adventures together. Dumas also tells of an imprisoned noblewoman who manipulates her guards to carry out political deeds, and whose story is intertwined with that of d'Artagnan. The story ends with each musketeer finding his place in life. Dumas's story refers regularly to the gender lens. In some cases, Dumas emphasizes the superiority of men; in others, he points out the weaknesses of female characters. These ideas are presented to the reader often, impressing upon the reader their supposed validity.

Chevalier's novel *Girl With a Pearl Earring* is based on the painting of the same name by Johannes Vermeer. The events of the story take place during Vermeer's life in the 1600s, in Vermeer's hometown of Delft in the Netherlands. The main character is one of Vermeer's maids. Chevalier based the entire premise of the story on what she could glean from the painting, as well as knowledge of Vermeer's personal life. Griet, the girl in the painting, is forced to become a maid after her father is stripped of his job, which is the family's only source of income. Vermeer takes her in, and she supports her family with the money she makes. Griet's dad, who is now blind, is interested in Vermeer's paintings and demands that Griet explain the paintings to him whenever she comes back to the house. On the job, she meets a young butcher, Pieter, who takes an interest in her. Griet, as the book progresses more, becomes interested in her master, and she eventually distances herself from the Vermeer family to marry Pieter. Much like Dumas's writing, this book contains suppositions that men are superior to women, and that women have significant weaknesses. The 'in-passing' appearance of these stereotypes discourages the reader from questioning their prejudice.

Female characters in both stories unsuccessfully attempt to attract men, but the men do not need to work hard to attract women. Griet, the main character of *Girl With a Pearl Earring*, narrates her story; everything that she thinks is printed on the page for the reader to take into account when considering her actions. Griet, while thinking about her master's kindness during her service for him and how she feels about him, thinks, "It was I who felt differently about him. I felt indebted. I felt



that if he asked me to do something I could not say no." (151) Griet, at this point, wants her master to notice her so that she can progress in her relationship with him. Similarly, *The Three Musketeers* contains a female maid character, Kitty, who attempts to get d'Artagnan's attention. Dumas writes, feeling, in a way, sorry for Kitty, "But, as we have said, d'Artagnan paid no attention to this persistence of poor Kitty." (696) Kitty is trying to attract d'Artagnan, but at this point in the story she does not have any success.

Griet and Kitty both desperately seek attention from the men that they're respectively attracted to. In both cases, the women have little effect on the men. D'Artagnan does not notice Kitty at all, and Vermeer tosses around Griet like she means nothing, taking her in and then ignoring their relationship in front of others. In Griet's case, Griet still feels like she does not have Vermeer's affection and tries to earn it. The books emphasize that the men do not care about the emotions of the women, and that the men can play around with the women as pawns. The men clearly have control of the relationships in both instances, and the women follow behind the men without discretion. The stories both value the opinions and actions of men higher than those of women, narrating the importance of the men to the women's identity. These authors are both undermining the power that women have, openly portraying women as weaker in their relationships. This brings women to a submissive level in which their thoughts and actions are influenced by men. Both authors have included this sense of dominance in their writing.

The authors, in their writing, use these gender stereotypes when referring to characters. Males are often referred to in both books using their surnames. Females are generally referred to using their first name, or even just relative to their spouse. In *Girl With a Pearl Earring*, rich males are referred to using "van" along with the family's origin, and females are referred to either with first names or based on the husband's name. "While van Ruijven's wife and Maertge remained oblivious, van Leeuwenhoek noted everything--Catharina's fury, my master's irritation, Maria Thins' shrug, van Ruijven's lingering hand." (153) Griet's master is also referred to as Vermeer, which is his surname, when it is mentioned in the book. Very much like *Girl With a Pearl Earring*, the male characters in *The Three Musketeers*, except primarily the three musketeers, are named based on their surnames. "D'Artagnan replied that he had been sent thither by M. de Tréville to treat for a supply of horses, and that he had brought back four as specimens. Milady in the course of the conversation twice or thrice bit her lips; she had to deal with a Gascon who played close." (695) D'Artagnan and M. de Tréville as referred to in the quote are male, and Milady is female.

The authors speak of the characters using this convention often throughout the book. This manner of naming the characters is based on the overall idea that men are more important than females. Indeed, Chevalier does not bother to introduce the name of van Ruijven's wife, or even that of van Ruijven himself. Since van Ruijven is only referred to by his surname, his first name is never used. Males are referred to only with their surname, and females like Catharina or Maria Thins tend to have their first names introduced. This is true in *The Three Musketeers*, too. Milady is referred to in the book mostly as just "Milady", and is only called "Lady de Winter" in a few circumstances. Kitty, Milady's female maid, is also referred to only as such. The males, however, are always introduced with their surnames, often never having their first names introduced. D'Artagnan and M. de Tréville are only two examples. The authors are both clearly stressing the importance of men when it comes to control of the family; when speaking the family name, generally the authors are referring to the dominant male of the family. This reference shows the importance of males in the



cultures that the authors are trying to portray. It also sheds light on the authors' views of the importance of males in families, and overall their internal ideas of gender roles and stereotypes. This is an unfortunate prejudice to be placed upon women, who are often just as influential as men in the control of their homes.

The authors portray females as generally more emotional than males in both books. *Girl With a Pearl Earring* emphasizes Griet's mother's distress a few days after Agnes, who is Griet's younger sister, dies. Griet's mother is so emotional about the situation that she refuses to allow herself to be happy. "Once my mother even laughed, before stopping herself with a shake of her head. 'God has punished us for taking for granted our good fortune,' she said. 'We must not forget that.'" (75) Griet's mother dramatically rejects happiness now that her daughter has died. Similarly, in *The Three Musketeers*, d'Artagnan's mother weeps when her son first ventures out into the world, leaving his family: "Mme. d'Artagnan was a woman, and still more, a mother. She wept abundantly." (15) Mme. d'Artagnan's weeping is emphasized by Dumas, showing her emotional weakness and unhappiness.

Griet's father does not display his emotion in relation to Agnes's death as outwardly as his wife does. Rather, he is generally detached from the world after that, and it is noted that few things make him happy other than descriptions of new paintings. His detachment versus his wife's breakdown is a clear example of the author's intent in stressing the woman's emotional vulnerability. D'Artagnan's father also does not outwardly show too much emotion when he parts with his son, in great contrast to d'Artagnan's mother. Dumas goes so far as to blatantly state that the reason that d'Artagnan's mother cries so much is that she is female. This is obviously gender-based, and the authors have applied masculinity to the emotionless male characters, and femininity to the females with outbreaks of emotion. There are two distinct behaviors here, and the authors emphasize the behaviors as well as their relation to the genders of the characters. The emphasis forces the reader to perceive the genders differently, and the authors are outwardly making this difference apparent. Importantly, this projects a negative image onto females, favoring the male personality that is portrayed.

Chevalier, in *Girl With a Pearl Earring*, and Dumas, in *The Three Musketeers*, both include gender bias that is likely deliberate, with the intent of making some point about the characters and the stereotypes that they exhibit. Still, the authors have internalized the stereotypes and include subtle references to them scattered throughout their writing. In both stories, women are generally viewed as weaker or less important than men. Women must try hard to attract men in the books, but the men have it easy when they want to control the women. Chevalier and Dumas imply that men are also more important than women in upholding the family name, and the family name generally represents the dominant male in the family. Even emotionally, women apparently have less fortitude than men do in regards to their children. There is no one rulebook to dictate that this is how society should be structured, but both authors emphasize this structure, and, at the same time, take it for granted. The stories take place in approximately the same time period in Europe, and the authors are basing their writings on real-world societal structure. The authors' use of these stereotypes, whether intentional or unintentional, affects the authors' writing and its interpretation, as well as the impact of the writing for those who read it. The authors reinforce the stereotypes when they include them in their writing, and the prevalence of the blatant gender differences in the books' characters reflects the state of society. If these books, written at completely different times in history, both emphasize these ideas so much, there is no reason to believe that the ideas do not exist in society today.



Critical Lens Analysis Reflection

24 April 2013

The synopses for the two novels were very generic, and didn't help to prove my arguments very well. The synopses should have highlighted certain parts of the book that I intended to critique later so that the reader would have the intended mindset about the book. In the thesis paper, the historical background information should include bits of the content that I intend to argue about later so that readers will be more inclined to understand and side with the arguments I present. The background information paragraphs are a good opportunity to get the reader in a certain mindset about the topic, and the opportunity needs to be used. An example is the general idea behind working conditions in the Industrial Revolution. Most people will go in with the mindset that working conditions were terrible and people were being mistreated. One of my arguments, however, talks about how the Industrial Age provided job opportunities for people, so it will be awkward for readers to interpret that argument if there is no introduction as to the benefits of the Industrial Age. Another issue was that all three analyses were weak in their criticisms, and they left the reader wanting more. Often, it would seem as though I was finally getting at something in my analysis, and then the paragraph would end and the reader would feel like the paragraph was incomplete. In the thesis, I should completely explain every argument and go in depth so that the reader completely understands the point I am trying to make with the analysis. Instead of letting analysis only scratch the surface of what I'm trying to say, it should really highlight the ideas I'm trying to convey.

In the critical lens analysis, the introduction to the paper was a good introduction to the topics and also to the lens that I was going to be examining. The single paragraph made it easy to start reading the paper and understand where it was supposed to go. The conclusion also wrapped up the paper and left the reader satisfied with the overall state of the analysis. Though the individual analysis paragraphs didn't go too far in depth, the conclusion was able to tie them together and remind the reader of the main purpose of the paper. This can be repeated in the thesis paper easily; the best way to make an introduction or conclusion sound good is to keep revising it until it both grabs the reader's attention and serves its purpose; this involves, in the introduction, *introducing* the point of the paper to the reader, and, in the conclusion, reminding the reader what the paper was all about. I also did well in finding deep similarities to argue. The arguments were not based on insignificant details, but rather on important observations that persisted throughout the two novels. The important strategy for the thesis paper is to keep the reasons important and relevant. The comparison should outline the significance of both of the events in history.

Writer's Notebook: Thoughts about final exam and portfolio

24 September 2012

I don't think the portfolio will be hard to piece together, but it will be hard to perfect. There will inevitably be times during which I won't want to choose among entries or projects, but I suppose I'll be able to pick eventually. That the final exam consists of previous work is good just because it will end with lots of content, but won't require all the work for producing the content compressed into a small amount of time.

Reflection on Thoughts about final exam and portfolio

It does feel nice to use old assignments in a new project. Editing them to improve them takes time, but there wouldn't have been enough time to write all of the content in this portfolio from scratch. It seems like I was correct when I wrote this; I had trouble deciding between my critical lens analysis and my thesis paper, so this portfolio has both of them. The portfolio is hard to perfect!



Literary Reflection

This year's humanities class offered a wide variety of reading selections for students to ponder over. Included were Voltaire's *Candide* and Tracy Chevalier's *Girl With a Pearl Earring*. Both books were unique in their writing style and premise, though such uniqueness is not always a good thing.

Candide was special in an undeniably good way. It was hard to make it through a page of the book without laughing such that those around me looked at me as though I was insane. Perhaps Voltaire's satire is better suited to be read in a small, enclosed room so that the reader can cackle as much as he wishes to without attracting unwanted attention. As the reader follows Candide's adventure in Westphalia, through Eldorado and then back into Cunégonde's arms, he is constantly delighted by unexpected plot twists and interesting (yet mildly disturbing) backstories.

Girl With a Pearl Earring, on the other hand, seemed like little more than a waste of time. I enjoy reading, and so I enjoyed reading this book in the same manner that I enjoy reading any good story about an underaged girl falling for a forty-year-old painter. There are more intriguing books to read out there, though, and *Girl With a Pearl Earring* did not appear to bring anything new to the table; it was not funny, it did not teach the reader anything, and large portions of the book were a little too cliché.

It is unfair to criticize a book without providing support for my arguments. Though it is arguably still unfair to compare any author to Voltaire, I will try to explain why *Girl With a Pearl Earring* did not live up to its potential.

Griet, from *Girl With a Pearl Earring*, works as a servant for Vermeer, a painter. She falls in love with him, though he does his best to keep his distance; he is married to Catharina. Lust overtakes him and he starts to invite Griet into his personal life. In the meantime, Pieter, a butcher, falls in love with Griet and tries to win her heart.

Candide, a parentless bastard child who lives with the beautiful Cunégonde, is drafted into the military after engaging in experimental physics with Cunégonde. After the war, which ends before it seemed to have started, he discovers that Cunégonde was *raped* and *disemboweled*. After visiting a city made up of gold and diamonds, he goes back to Westphalia in search of his lover who, he believes, is dead. He finds her alive (after all, people often survive such things) as a victim of two men who take advantage of her, and, presented with no other choice, runs both of them through with a sword. Candide visits Cunégonde's brother, who has also come back to life, and has a great reunion that lasts for the whole of two minutes. When Cunégonde's brother discovers that Candide intends to marry Cunégonde, he becomes enraged and finds himself skewered with Candide's sword (don't worry, he comes back to life again later). Cunégonde grows fat in a small home in the country, and lives with Candide for the rest of their lives.

Griet doesn't end up with Vermeer, in case you were wondering.

Girl With a Pearl Earring just didn't seem *juicy* enough to me. Perhaps I've been spoiled by such fantastic literature as *Candide*, but I have never watched a movie or read another book with as much surprising (and interesting!) content as Voltaire's *Candide*. If a novel is going to be bland, there should be a point in having a humanities class read it. *Girl With a Pearl Earring* did not appear to have such a point. This is why I was so disappointed by the book.

I wasn't disappointed with *Candide*, though, in case you hadn't figured that out.



Writer's Notebook: Maps

24 September 2012

"Oh no, I'll never need a map. This road is marked, you see."
 "That's not correct; you're silly, John, and have already passed exit 3."
 "Oh my, you're right! How stupid of me. I'll turn right around over here."
 "This wouldn't have happened had you used a map, and known the exit you were near."

And so they turned the other way, while looking in Joe's lap.
 They knew exactly where to go, because he had a map.
 Some say that maps don't have a use, that one might use a guide.
 One day, I hired one, not cheap, and later found he'd lied!

I'd go on, but I truthfully know pretty much nothing about maps.

Line 2 has some syllable count issues, and line 8 has a stench of "I forgot I had to make the previous line rhyme, so I didn't plan ahead."

Just to make it easy to understand how it's to be read, I'll record it and upload it to THIS URL:
<http://soundcloud.com/syntaxblitz/maps-poem>

Reflection on Maps:

I didn't write too much more poetry in my Writer's Notebook throughout the rest of the year. That's not to say that I didn't write a lot of poetry; most of the poetry that I write has some sort of purpose. I'll rarely write just for the sake of writing, and that applies especially to poems. Sometimes I'd write love poems or instructional poems (because normal step-by-step lists are boring), but those didn't go into my writer's notebook because I wrote them with specific purposes in mind.

Still, my love of poetry has never died. Few feelings are more satisfying than reciting a poem with perfect meter and rhyme, and often after finishing a poem, I'll do so to the point where those around me are unsettled by its constant repetition. The language in which I write my poetry doesn't matter to me; I have written in English, French, and even Haskell. As long as it sounds pretty to me, I'll show it off to everyone I see.

"Maps" was an exception to my normal poetry flow. This was written a few days after we started writing in our writer's notebooks, and I felt kind of pressured to be creative. I wrote this just because I wanted to prove that it's easy to write a poem about anything. In eighth grade, I wrote about the desk I was sitting at because someone didn't believe me when I told him that it's possible for anything to be the subject of a poem. Here, I've written about maps.

There was no real point to this poem, but I'm proud of it. When it's read correctly, the meter is really fun, and the rhyming (though awkward in a few places) works out pretty well. It wasn't a hard poem to write, but what might be the most fun thing about writing poems is that it's possible to make something sound fun without too much effort.



Writer's Notebook: You've gone too far

8 June 2013

I'm starting to think that the government is overstepping its bounds.

I'm not really sure if I'm allowed to think that. There's no reason to believe that sedition of this sort will even be legal in a few years... or months. The United States is becoming a monster that we've read of in science fiction novels over and over. The problem is that if we don't get off our fat asses and do something about it, we're not even going to notice that anything has changed. I grew up learning in my Social Studies classes that our government was immune from the temptations of oppression to which so many other states had fallen victim. Our systems of checks and balances will make it impossible for the government to rule unregulated over its people. We have an immutable core set of values written in plain text in our constitution. We are not an oppressed people.

Yesterday, a news report was released that stated that a document from the National Security Agency was released that outlined procedures for monitoring communications of US citizens. Anything sent over the Internet or said over the telephone might very well be stored on a datacenter located in the United States.

I already knew this. It was obvious; the Internet is delivered in plaintext most of the time. When I communicate, I assume that logs are kept by my own computer, the person with whom I'm communicating, the service I'm using to communicate, my Internet Service Provider, the Internet Service Provider of the person with whom I'm communicating, and the governments of the areas that both of us reside in. I'm also open to believing that there are others monitoring the communication. Unless I understand *very well* the technology and protocols that I'm using to communicate, I never assume that my communications are encrypted.

Something that's rather worrying, however, is that the government has unrestricted access to the logs and data that online services keep. Skype, for example, encrypts data before sending it to Skype's servers, and then encrypts it before sending it to the recipient. It is decrypted on the server, though, and it is reasonable to assume that Skype keeps local logs of many communications. The worrying aspect here is that the government is allowed to view this information without special permission from Skype, and *Skype isn't even allowed to tell the public that this is happening*.

I was annoyed, but neither surprised nor disturbed when I discovered the news yesterday. I already use encryption protocols like RSA when I need to speak securely with people, and keys are often exchanged in a guaranteeably secure manner. I am not über-paranoid about this sort of thing, but my life certainly wouldn't be ruined if my ISP or the government logged everything that passed through my network.

Today, a report was released that stated that the Obama administration has abruptly ended two trials being held by California federal courts, one against the administration and one against the National Security Agency. That's the part that scares me. The administration has claimed that the trials would involve government secrets that should not be revealed, and so it is justified in preventing these cases from being heard.

There goes the whole "checks and balances" thing that we love to profess. I have no reason to believe that the government is here for the people anymore. I suppose the only solution left is rebellion. I'm going to stop writing now, though, because I'm typing this on Google Docs and the US government has unrestricted access to all of the documents posted here.



Commentary on Genocide Reflection:

I should warn you now that you might think I'm a Nazi after reading this. My thesis effectively leads to the argument that Hitler is not such a bad person. I'd like for you to give it a read, however, and judge my argument based on what I have presented. Keep in mind while reading the piece that I do *not* like Hitler, and I do *not* approve of his actions. Killing people, I believe, is not the way to prevent them from doing things that you don't want them to do. Still, it is ingrained in society that we worship certain figures that killed many people, and hate others. Here I am analyzing the distinction that we make between heroes and villains.

If, after reading this, you think I am insane, that is okay. Perhaps I am not completely sane. My arguments make sense to me, though, and I hope that they make sense to you in the same manner.

Genocide Reflection

It seems as though genocide is less about killing a bunch of people and more about prejudice.

Looking back in history, almost all of the important guys killed lots of people. You don't get your name in the books if you don't meet your quota. This applies to 'good guys' and 'bad guys', and 'guys who initially seemed kind of good but then turned out to be completely insane' (I'm looking at you, Robespierre). Some of them got away with it by working as a patriot for their countries; a general who is very successful in the military never looks bad, as long as his side ended up winning. Some of them were United States Presidents who commanded thousands of troops to go kill a bunch of people.

They all killed people, though. Whether or not they were justified is debatable, depending on their circumstances and their actions. I wasn't particularly disturbed, however, when I found that Robespierre held lots of executions during his reign of terror. We had already been told that he was important, so it was about time he decided to kill people.

The point that I'm making here is that when Adolf Hitler or Saddam Hussein committed genocide, they didn't initially seem all that awful. While trying to examine the difference between these genocide advocates and 'good guys' who got lots of people killed (perhaps Abraham Lincoln in his fight against the confederacy), I found that the only difference was that the leaders of genocide selected whom to kill based on prejudice; they killed large groups of people like everyone else did, but these people were selected based on non-defining (though often relevant) characteristics. Hitler wanted to remove Jewish people from Germany because he thought that their presence was making Germany a less peaceful place to live. He was probably right in this respect; his mistake was two-fold: he singled out Jews, and he selected *all* Jews instead of problematic ones.

So when people think that I am insane for not disliking Hitler as much as they do, they should realize that many people did similar things. Though I never did approve of killing a bunch of people to get rid of them, the main crime that I accuse Hitler of, relative to the other historical figures who killed large bodies of people, is prejudice, not murder. The only thing that makes these 'villains' stand out is that they used a less acceptable criterion for selecting those who were going to be killed.



Art, Music, and Philosophy: Reflection

There exists a constant interaction among the events that occurred during time periods and the expression of thought, whether through music, art, or philosophy, that was present during the periods. New philosophies were able to spark large change in history; the Renaissance occurred out of a desire to move away from religion and from the adoption of old philosophies from Greece and Rome. Most of the music produced during the middle ages was written for the glory of the Catholic God, and then art produced during the Renaissance largely emulated art from Greece and Rome. Philosophies, as well as new art and music styles, can influence the path that history takes. In the same way, these arts, which include literature produced during the period, are created based off of the external stimuli that affect their creators.

Voltaire's *Candide* criticized the lack of the King's presence in the lives of the common folk; Candide does not recognize the King when he is presented face-to-face with him. Voltaire praised socialism, portraying the mythical Eldorado as a perfect place to live. He also greatly criticizes Great Britain, allotting less than a page of Candide's adventure to his experiences with the country. *Candide* is a direct criticism of many different aspects of life at the time, so it is effective (though perhaps a little *too* direct) in displaying the importance of external sources to the internal thoughts of the author.

Philosophy from the most important central figures of the topic both 'pushed' and 'pulled' with the history that took place around philosophers. Few philosophers would assert today that the Earth is in the center of the solar system (as Aristotle did) or that heat is actually a fluid named caloric (as Antoine Lavoisier did before Jean-Paul Marat had his head chopped off). Still, philosophy remains somewhat detached from scientific discoveries. Religion has a big part to play in the non-scientific part of philosophy, and advancements in science and religion together form the basic beliefs of philosophers. When religion must cede ground to science, philosophers can build off of the new knowledge that they have.

Some aspects of philosophy are inherently unknowable, and so, in a sense, these sorts of philosophies (and also religions based on the same beliefs) will never die off. There is no way to know if we are actually characters in a book, or if there was a Creator who put the universe into existence and then decided never to interfere. These are the philosophies that I can take with me; if I cannot create a scientific hypothesis that can be proved wrong, there is no way to know that the theory is untrue.

Art and music can, together, capture the 'feel' of a historical event without putting it into words. Both sorts of works have developed ways in which artists can emulate the passing of actual events; some paintings can be divided into sections that portray different events, and music can often be divided into movements that have different moods. These sections and movements might follow a progression, like in a piece of music that has an exciting and moving beginning, is interrupted by a ballad, and then ends with an even more intense finale, or they can seem random, like in a slow, steadily flowing piece of music that suddenly changes direction and becomes intense (I urge you to listen to the transition between Bernstein's "Westphalia" and "Battle Music" in his musical, *Candide*). These ideas are more difficult to express in drawn art, but their expression is not impossible. This is, in both forms of art, a way of mapping the emotion and experience from real-life events to music and art.

Even these basic interactions among art, music, philosophy, and history can be interesting.



Commentary on Password Hashing:

This is yet another explanation of a programming concept. I seem to be rather fond of these. I'm not sure whether or not it's well-explained, but you can read about it here if you'd like.

When I felt pressured to fill up pages for the writer's notebook, this is what I did. It felt like a cheaty way out; there's no way to argue that it doesn't have a lot of dense content, but it was still pretty easy (and enjoyable) to write. Mr. Petrushun never complained about my constant attempts to teach him things that he didn't care about, so I managed to make it through the entire year doing this.

I'm content with the situation. The only problem is that it ended with the necessity to apologize to everyone who reads my portfolio in advance.

It's worth it.

Writer's Notebook: Password Hashing

6 January 2013

As a website developer, you're required to act as though the contents of your private database are publicly available. An attacker might compromise the contents of your database at any time, so you need to store the data very carefully.

That means it's a *really* bad idea to store user information in the database like this:

<u>user</u>	<u>password</u>	<u>email</u>
george	ilovetacos	george@gmail.com
jim	ihategeorge	jim@yahoo.com

If an attacker gains access to the database, he can log into anyone's account. If users are stupid enough to reuse passwords, he can also log into their email accounts.

How do you fix that, then? It's kind of common sense that you need to store passwords if you want to let users log in, right?

As it turns out, it's really easy to keep passwords out of the database while still effectively authenticating passwords.

There exist functions called hashing functions that will, provided an input, produce a hash. The hash is a string of numbers or text (again, it's a bunch of ones and zeroes that you can represent however you'd like) that *cannot* be reversed; knowing a datum's hash will give you no insight as to what datum produced that hash, in a perfect hash function.

So, really, that's all that websites have to do. When you sign up, your password is run through a hash function and the hash is stored. Then, when you log in later, the password you type is hashed and the result hash is compared to what is stored in the database.

Hashing is useful and powerful, but only when it's done correctly. A popular hash algorithm used today is md5. md5 has a few big issues, though.

md5 is *fast*. md5 is *optimised* to be fast. md5 wasn't actually designed for password hashing. It was designed to create checksums for files to verify their integrity. It's very useful for that (though it's no longer recommended to hash RSA certificates with md5, because successful collision attacks have been performed—that, however, is beyond the scope of this writing), but there's a problem with having speed in your password hashing algorithm.

If a hacker can access the hashed password, he can brute-force every single password



combination to check against the obtained hash. md5s can be computed with a modern desktop computer at a rate of millions of passwords per second. There do exist hashing functions made for the sake of password hashing. bcrypt is an example. It's designed to take *longer* as computers become more powerful (not in actual time, but more time relative to computer strength). This is acceptable for a user login form, because the web server only needs to compute a single password when a user logs in, while a brute-forcer needs to compute billions. Fifty extra milliseconds is negligible when a user logs in, but it makes brute-forcing effectively impossible.

The other problem with md5 is that it's well-known. There exist databases called 'rainbow tables' that attempt to index *every single md5 hash* along with its original text. They obviously can't feasibly have too many entries, because there are a *lot* of possibilities, but they are definitely effective.

The primary counter to this is to use salts. When you salt a hash algorithm, you provide additional information (sometimes just by appending it to the plaintext) to add more entropy to the hash. If you store a random number along with the user's account information, you can use that number as a salt. Now, a rainbow table is useless with all these new possible values. Brute-forcing takes the same amount of time, but rainbow tables become pointless.

bagels are yummy

Commentary on Silas:

I was in a creative fictional writing sort of mood, but I've never been very successful at coming up with ideas for my writing. I had the idea to use a character that I already invented for the story, which made things a lot easier.

This character (the narrator) is a character that I roleplayed last year in a *Dungeons and Dragons* campaign. He went through a lot, and this entry in my writer's notebook was an attempt to start to chronicle his experiences. The start of the story picks up where the campaign left off, but the extensive flashback already happened in the campaign. The idea was that if I could write out what had already happened from my character's viewpoint, I'd be able to get into the 'mood' of writing as the character.

I'll warn you now that I never actually finished "Silas". I discovered shortly after writing this that I don't actually like to write fiction. The portion of the flashback that I wrote about is only the beginning of a *very* long journey that our characters went through. Keep in mind that we would meet for three hours every Tuesday night, and this campaign ran for about a year. We had covered a *lot* of ground. I intended to continue entries every few weeks, picking up where I left off each time. That never happened.

Part of the discovery of my dislike of fiction (or, at least, writing it) was that I found out that I'm actually terrible at writing fiction. My word choice in the first few paragraphs is painfully excessive, and I didn't actually notice when I was writing it. I'm disturbed to think of what could have happened if I had let myself continue to write for too long.

Writer's Notebook: Silas

31 October 2012

I woke up and the thought had really sunk in. I unclenched my fingers and spread the crumpled newspaper I was holding onto the mahogany floor. I performed for myself a little jig and



heard the floorboards creaking below my feet.

Silas is dead. The thought cascaded through my mind, becoming louder as it tumbled over itself. It sank in even more. Soon, I couldn't keep my excitement contained.

"Silas is dead," I whispered, savoring the sound the words made as they flowed into my ears, the feeling on the tip of the tongue as my mouth formed the liberating statement.

"Silas is dead," I declared, a little louder this time. I was *really* starting to like those words.

"SILAS IS DEAD!" I proclaimed, as though to truly finalize the situation. This time, I was sure the entire inn had heard me. I didn't care. Those were words of *power*, goddammit, and I had the right to proclaim them anywhere I damn well pleased.

Sure enough, I had roused Gardain in the room next door to me a bit earlier than he had anticipated waking up.

"Shut your trap, boy, or I'll come over there and shut it for you," he shouted through the wall. After hastily forming an apology, I sat down on my bed and begun to prepare to head downstairs for breakfast.

I should probably give you a bit more information on the situation, starting with the most important tidbit.

My name is Silas.

And Silas—that is, I—isn't *actually* dead. And the person whom everyone wants to kill is I. I've been a bit naughty during the last few months, starting inevitably with the initial boat ride from the nautical port-village of Daemon. I had just found a new adventuring party, and we had all chipped in so we could cross the vast sea of Mer.

I had misled my new party just a bit, though. Being the gnomish bard that I was (but no longer am—we'll get to that), I obviously wasn't a very strong fellow. I had needed to impress my new friends, though, so it had become necessary to think of something, quick.

Luckily, my parents had been rather skilled at bluffing, and it was a trait that they had passed on to me.

Meta: I have *NO* idea how to smoothly transition from the past perfect to the simple past, so I had the brilliant idea to shove this paragraph in here so that you can't call me out on a poor transition.

So, I profoundly displayed my godlike strength to the party, and they quickly trusted me.

I was standing rather smugly with the rest of my new party as we chartered a ship to get across the sea. I managed not to break important bones in my face when I cringed at the price of the trip.

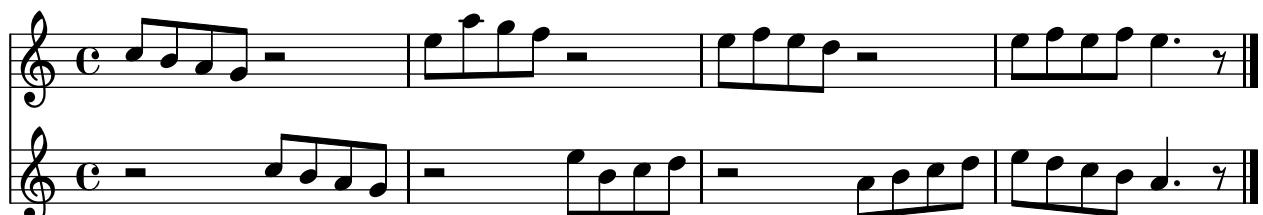
"Five hundred gold pieces? You must be out of your mind!" That was Kathra talking. She had never been one for diplomacy. Still, she was right. I did the calculation in my head, and it meant that I'd have to pay eighty-three of my hard-earned and not-so-plentiful gold pieces, with some change.

Rodrik, the diplomatic fellow of the group, stepped in.

"Is there anything we can do to lower the cost?" There had better be, because this was the only ship in the dinky port that we could charter. If the ship's captain had said no, I would have turned him into the mayor for maintaining a monopoly.

He didn't, though. He said that, if we had enough strong men with us, we could sail for only 350 gold pieces if we helped out a bit around the boat.

It was still a stupidly expensive price to pay for the ride, and was undoubtedly a form of



price discrimination. Surely he would have charged a single passenger only 150 gold, and five extra people on the ship meant nothing relative to the ship's actual weight. We took the offer, though, because it was the only choice we had.

I realized something, though. When the captain said he needed strong men, everyone had looked towards me. Only at that point did I interpret *why*.

I had shown them my amazing strength, and now they expected me to be able to haul large crates and pull ropes that were thicker than my neck with immeasurable ease.

I was pretty much screwed.

I quickly sifted through recovery ideas, mindlessly handing over the money I owed. I could slip on something the moment I got on the ship, or perhaps make it seem like one of the ship's crew accidentally fell on my or bludgeoned me or something. Anything to break a leg or an arm as an excuse.

How did I get into this mess? I was just pretending to be strong to impress some adventurers.

Wait- pretending. That's how I can get through this. I can *fake* a wound- or, better yet, I can pretend to *help* on the ship. That way, I'll seem useful.

And so I did. We made it all the way to Gardor on the other side of the sea, and no one suspected a thing.

Writer's Notebook: The Curse of Dimensionality

18 March 2013

This should, in theory, be a quick entry. The Curse of Dimensionality isn't a hard concept to grasp—there's some background you'll need to know, though. Let's see how efficiently I can do this.

A neural network is a group of computational functions that uses probability and statistics in an attempt to simulate the workings of an actual neural system. Neural networks are the basis for handwriting recognition systems, voice recognition systems, and NLP (natural language processing) systems. Generally, a neural network is given a "training set" of data. In a handwriting recognition example, that data might be a bunch of pictures of handwritten sentences, *along with* the actual text written.

Neural networks use their training data to try to assess the probabilities of certain possible results. Generally, when they are informed that they produced correct output, they will add the new data to their training set.

Now, suppose an example in which the neural network needs to produce a "y" value given an "x" value on a 2-dimensional grid. The network will have training data for x/y pairs, and will need to compare the likelihoods of certain y values.

Here's the problem: it is much simpler to process the data if the graph is divided into vertical "slices". Given an x-value, the function can peek into its training data for the closest slice, and then interpolate a more detailed y-value from an average provided by training data. This y-value won't be too accurate, though, if the slices are too big.

That's where dimensionality comes in. Surely, we will have more precise results if we use smaller slices. We increase dimensionality, or the slice precision, and we get more precise answers. The "curse" here is that, for each slice there must be at least one y-value—otherwise, if an x-value input falls into that slice, the network will not be able to provide a result at all.

Thus, we keep broader thresholds for our slices in neural computing so that the "curse" doesn't get us. Sure, we want precision, but too much precision leads down the dark hole that



eventually winds up at the Curse of Dimensionality.

Commentary on The Curse of Dimensionality: A short story

"What?" you ask. "Didn't I just read about the curse of dimensionality?"

That's a fantastic observation, reader. I'm certain that you are wondering why you're about to read yet another entry about the curse of dimensionality.

I was in a creative writing sort of mood that day. I'm not sure why... creative writing moods tend to not end very well for me. That's why I've put most of the creative writing in the back of the portfolio. The idea is that you'll never get around to reading it, because I will have bored you with technical descriptions before you get here.

Looks like you got here.

Darn.

I guess I'll explain the thinking behind writing this story. I had just written about the Curse of Dimensionality, and I thought about how that sounded like a cool title for a short story (go figure!). I started formulating ideas as to what sort of plot such a story would have. I came up with what I thought was a pretty good idea; a short story named "The Curse of Dimensionality".

It's too bad I never finished it. I guess that's a theme.

I'll just give you a rundown of what was supposed to happen after this. The scientists were supposed to get the QSS working, but then it turns out there are buggers in every universe, and they're spread too thin (the Curse of Dimensionality!) throughout the fifth dimension and all of humanity dies. Kind of sad. I guess the characters are all better off since I didn't actually finish the story. Good for them.

Writer's Notebook: The Curse of Dimensionality: A short story

18 March 2013

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>      you said it's done?
>      almost. have to wait for peer review.
>      don't wait! dude, this is big. you realise you're pretty much
saving humanity?
>      don't get ahead of yourself, bro. it'll only be a few more days.
then we can explore the /true/ potential of this technology.
```

Joseph Lenton sat up from his desk, pushing his hovering chair backwards. He peered down at his watch. Two thirty-eight in the morning. Not that it mattered. Joe couldn't sleep tonight, no matter how much he wanted to; His team, of which he was the lead, had just compiled its research from the past two and a half years into a neat, groundbreaking package that had just been sent off to Germany for peer review.

This wasn't the sort of work that Joe particularly liked to do. He liked the theory, the numbers. When it came down to getting into the actual, physical *machines*, Joe choked. Too many things could go wrong when you were building Quantum Sync Shifters for *real*.

It's not like Joe had much of a choice. His team had been assembled and mandated by the Democratic People's Federated Republic of the United Territories and Provinces of the Great



Alliance of the Eight Continents to work on bringing this theoretical technology into the “physical realm”. All of the other scientists who used to do the “dirty work” were stationed in Asia, which got hit very hard fourteen years ago in the Collective Extraterrestrial Invasion of 3674. The entire laboratory was destroyed, and all but two of the scientists were killed. Those two scientists were now part of Joe’s 28-man team, and they headed the assembly committee in the North America-based laboratory.

The invasions started thirty-size years ago, on the Fifth of May, 3652. Before that day, humankind had never successfully made contact with extraterrestrials. “First Contact” involved the extraterrestrials, nicknamed the “buggers”, tossing a rock half the size of the Moon towards the Earth, striking South America dead-on. This occurred during the war between Japan and New Australia. but the devastation was so terrible that humanity necessarily needed to unite. It was agreed at a United Nations summit meeting that humanity itself would be lost if the countries did not work together to face the threat.

Except North Korea, who sided with the extraterrestrials immediately. They were quickly shut up by a couple of conveniently-placed nuclear bombs.

It was now Joe’s job to develop the first working Quantum State Shifter. The QSS was based on theory that had been being developed for just under a century at that point.

In theory, the QAA could send any matter across dimensional borders, and at any point in spacetime, forward or backward in the fifth dimension. It would, *in theory*, “shift” matter out of sync with the universe, into another spot in the fifth dimension. This had huge implications for the situation of the bugger invasion. Buggers, at that point, could strike at any time, and they generally spaced out their attacks ten years or so. Their strike location seemed to be random, though attacks always seemed to strike land; no bugger strike had ever hit an uninhabited ocean. Humanity did not have much actual hope of surviving on Earth in this universe, so it needed to run away.

The QSS would serve three purposes. First, people would be able to venture out into the new universes to collect new resources. The idea was that scientists would “shift” into another spot in the fifth dimension, grab useful resources, and “shift” back. The resources could be used to generate energy, or to fortify defense bases on Earth.

Second, the QSS provided hope of escape. If it’s possible to shift “refugees” onto other worlds, humanity can live on, safe from the buggers.

Finally, and perhaps most interestingly: the QSS can send people to any point in spacetime in the other universe. If a QAA were to be set up in the other universe as well, scientists would be able to travel FTL and also in time. By shifting to the location of the QSS in the other universe, then shifting from that QSS to the desired time and location in the initial universe, travel throughout all four dimensions in this slice of the fifth dimension would be possible.

The only concern was energy. The more you move in all five dimensions, the more energy the shift costs. Luckily, resources would become available from other universes once the QSS went online.

At five forty-six in the morning, as Joe was poring over his team’s work and checking for flaws, Joe felt the ground rumble under his feet. His heart sank as he quickly realized where he’d felt the sort of rumble before. When Asia was hit by the invasion, he had felt the same thing. He knew that, although it certainly was not occurring in North America, someplace had just been hit very



hard.

The television to his left flicked itself on a minute later. It was Europe. Europe had been hit. Germany and Austria were the most devastated.

It didn't take long for Joe to realize that his peer review was probably not going to go through. He rounded up the team of 28 scientists to call a vote.

"Alright guys, we don't have a choice. We've got to do something if there's to be any hope for humanity. Screw the peer review. We need to shift. Now."

"As you probably know, it is team policy to obtain unanimous consent before skipping peer review. All in favor of going through with the project without peer review, please raise your hand."

Everyone in the room raised his or her hand; everyone but two. The scientists who had fled from Asia were not holding their hands up.

"Justin, Gina... why do you insist upon obtaining peer review results? Where will we even have our work reviewed?"

"We can't *do* science without peer review. If no one else checks our work, is it even science? We could hurt ourselves, or engulf the entire world in flames. This is the first machine of this nature that anyone has ever built. We don't know what it will do," argued Gina.

"Everyone else agrees that we should do it. Please think rationally, Gina."

Someone else piped up. "I'd like to point out that while team policy requires unanimous consent to bypass peer review, it requires only three-quarters' vote to remove someone from the team."

Justin and Gina looked at each other, realized that their situation was hopeless, and walked out.

"I guess that's it, then," said Joe. "Let's do it."

They powered up the QSS.

Commentary on The Twelfth Root of Two

This one is still an explanation of a cool concept, but I promise it's different this time. It's actually *not* about programming! I know, that's weird. It's awesome, though. Trust me.

This one involves two of my favorite things in all of existence. It's got math, and it's got music! Even better, though, it's got *both...* *at the same time*. I can see your mind exploding right now.

This is one of my favorite concepts just because it's intuitive, useful, and fun (and easy!) to try out on your own. This entry refers to the application of math in music. There's absolutely no way that you could possibly not want to read this.

I say it in the first paragraph of the entry, but I'm going to say it here, too: the twelfth root of two isn't actually *special*. The number 'twelve' is insignificant, because that's just the number we like to use to say how many steps (half-steps, really) there are in between two notes in an octave. There are actually other cultures that use different music notation systems that *aren't* based on the twelve half-step model. Once you've modified the number, though, this math still works. Isn't that great?

The number 'two', on the other hand, is very significant. Doubling a frequency (or halving the length of a string, or a tube, or anything of the nature) is what makes the octave go up. That won't change no matter what culture you're in. You'll properly understand why I love this so much after you've read the entry, if you don't understand just yet.



Writer's Notebook: The Twelfth Root of Two

15 March 2013

1.059304694... is a cool number. It's not like π or e , in that it's not a "special" or "natural" number; still, it's a very useful number to know about.

Let me provide some introduction. I'm not sure how much of this you already know, so I'll start at the beginning.

Music, of course, is produced by vibrations. Any sound you hear is a pattern of vibrations. Music is a collection of tones that are produced by those vibrations. If you've ever played with a piezo element, you might have some experience here. A piezo element is a small, round metal plate, sometimes encased in plastic. When electricity is sent to it, it makes a faint clicking noise. That's the noise of the plate vibrating.

By itself, a piezo element is essentially useless. Faint clicking noises hardly constitute music. Or... don't they? Music is made up of tones, and tones are made up of vibrations. Still, a single click is not a very good song. The piezo element, without external help, is not going to produce tones. That external help generally comes in the form of a microcontroller.

To make a tone, the piezo element needs to vibrate continuously. A microcontroller can send short pulses to the piezo element, and so will be able to create tones.

Tone pitches are measures in Hz (Hertz), which refers to the number of "clicks" per second. So, if I have a frequency that I want to turn into a tone (we'll use 440Hz in the example), I start by dividing one by the frequency (effectively taking the frequency's reciprocal). That will provide the delay between each click.

I use my microcontroller to continuously loop:

```

1   Forever , do:
2       set PIEZO_ELEMENT on
3       wait ( ( 1 / 440 ) / 2 )
3       set PIEZO_ELEMENT off
5       wait ( ( 1 / 440 ) / 2 )

```

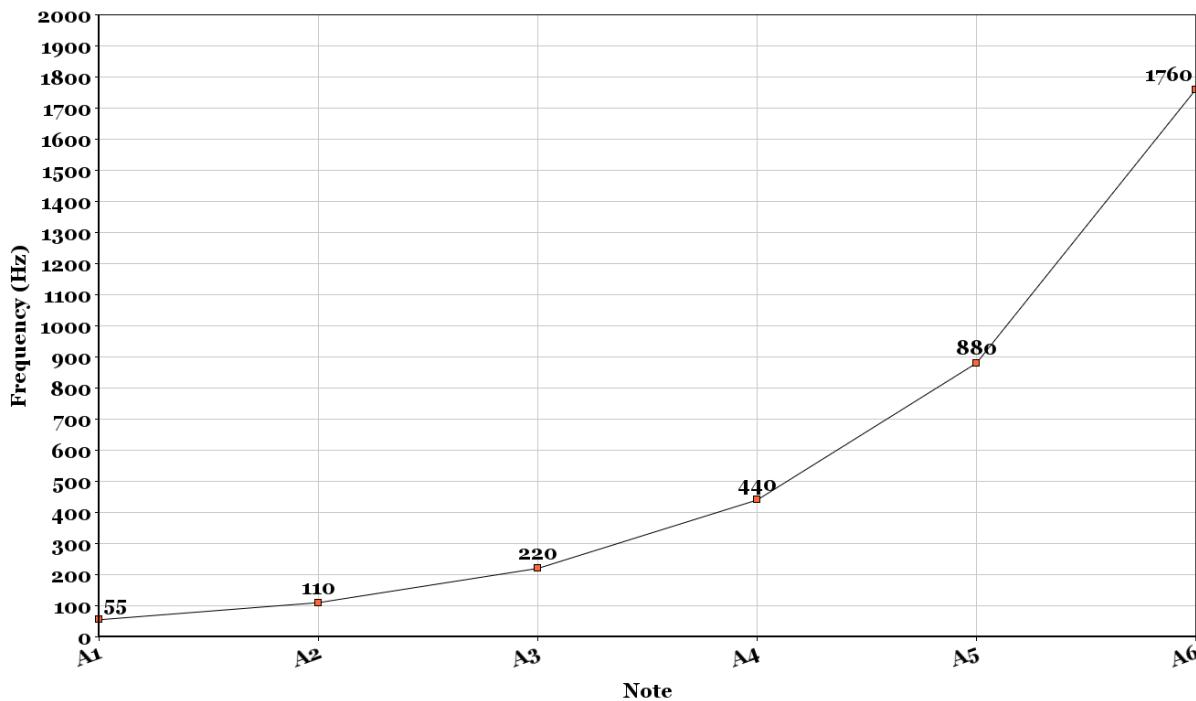
The loop will click the element, then, half of the specified time later, will reset the element, wait the remaining time, and repeat.

That code will produce a 440Hz tone, which is generally known as an " A_4 ".

I'm getting to the relevance of 1.059363094..., don't worry.

In music, you can go up an octave ($A_4 \rightarrow A_5$) by doubling the frequency. A_5 's frequency is 880Hz. Likewise, A_3 's frequency is 220Hz. I'll make a nice little graph to display the significance of that fact.





Note frequencies increase exponentially.

When you hear the same note in three consecutive octaves, you'd probably be willing to say that the note in the middle is "in between" the other two, and *sounds* in between the other two. In reality, the middle note is only a quarter of the way from the first note to the third note, in terms of frequency.

Now, it's just math. There are twelve half-steps in an octave. When you move up on half-step, you multiply the frequency by 1.059463094... Why, though?

1.059463094... is the twelfth root of two. It can be written mathematically as $\sqrt[12]{2}$, or $2^{1/12}$. That means that, when you multiply 1.059463094... by itself twelve times, you'll get 2.

From this point, I will define $t = \sqrt[12]{2}$ so that I don't have to keep writing it out.

If you multiply a frequency, like 440Hz, by t^{12} , you'll double it. Twelve represents the number of half-steps from the initial note. Multiplying a frequency by t^1 , then, would produce the frequency one half-step up. Multiplying it by t^4 would bump up the frequency by a perfect third. It works in the opposite direction, too. Multiply the frequency by t^{-1} to move it down a half-step.

It is possible, then, to find any note's frequency given one starting point (a popular one is $A_4 = 440\text{Hz}$).

$$f = 440 * t^s$$

where f is the final frequency, t is $\sqrt[12]{2}$, and s is the half steps from A_4 .

Give it a try. $440 * t^9$ should be C_4 , or middle C; and, indeed, it comes out to the 261.63 that we all know and love.



Writer's Notebook: Numbering Systems

13 June 2013

This is just going to be a quick write-up explaining numbering systems of different bases, because my entire portfolio is numbered in hexadecimal and I can imagine that that might anger a few people who aren't smart enough to figure it out for themselves.

You might not have known this, but humans tend to have ten fingers. Those fingers are pretty handy. We can use them to grab things, to mash things, and, importantly, to count. Using my fingers, I can count all the way up to ten!

Example: I set up an altar where people can sacrifice tacos to me. Jim hands me a taco. I hold up one finger on my right hand because now I have one taco. Then George gives me another taco. I hold up a second finger on my right hand because now I have another taco. If I'm ever unsure as to how many tacos I have, I can look at the number of fingers I have and the answer will be right there!

Three more people give me tacos. Now I have five tacos (I know, because I looked at my hand to check). But what about when Ginette gives me another taco? I don't have six fingers on my right hand!

I can hold up a finger on my left hand. Now I have a total of six fingers held up.

That's all fine and dandy, but what happens when I get my *eleventh* taco? I can't just give the taco back to the person who gave it to me. I want to *eat* that taco!

We have invented the digits 0-9 to store how many tacos we have at any given time. If we take a pencil and paper and write one of these digits, we can come back later and see what number we wrote down. But we can't have a digit for every number. That would be silly!

So, after we get past nine tacos, we put a '1' to the left of a '0'. The '1' means we have 'one ten', and the '0' means we have 'zero ones'. If we have twelve tacos, we write '12'; that's one ten, and two ones. If we have twenty-three tacos, we write '23'; that's *two* tens, and three ones. That's a lot of tacos!

I'm going to cut the silly baby-talk now, if that's okay with you. It was getting more annoying for me than it was for you.

Each time we add a digit to the right, we're multiplying that digit's value by ten to the power of the digit number. The third digit, counting from the right, in the number '254', is worth 2 times 10^{3-1} . The second is worth 5 times 10^{2-1} , and the first is worth 4 times 10^{1-1} . This continues such that we can represent any number.

In exponents, the big number that has smaller numbers attached to it is called the 'base'. In numbering systems, we still refer to this as the base. For this reason, the numbering system that we use, called 'decimal', is a 'base-10' numbering system.

There are other numbering systems, though. Let's look at binary, which is a base-2 numbering system.

The number '1101' actually means

$$1 * 2^3 + 1 * 2^2 + 0 * 2^1 + 1 * 2^0, \text{ which evaluates to } 13.$$

Hexadecimal is just a base-16 numbering system, with digits 0-F.

I bet you can figure out the rest on your own. To give you a reference point, this page would be page 36 in decimal.



Historical Biographical Narrative: Josquin des Prez

12 October 2012

Josquin des Prez, my great-great-great grandfather, whom I've heard a lot about from my great grandfather, was an extraordinary man whose talents were undeniably some of the most important in the Renaissance. My great grandfather told me that Josquin's love of satire was to be neither underestimated nor understated, and that the great composer was a genius in many aspects of his life: including, most certainly, his immeasurable humor. I've listened repeatedly to Josquin's great works (for there are many), and it's impossible for them to ever get old. His musical genius will live on, influencing modern music just as it influenced later music from the Renaissance. Here is a story that will demonstrate how Josquin des Prez was truly viewed by society.

"Have you not even heard Heinrich Isaac's compositions?" the assistant directed at his master, almost pleadingly. "He's really not that bad."

"I'm not *suggesting* that Isaac is a bad composer. He supersedes des Prez in more ways than one, certainly. I want des Prez anyway, because his genius will complement the chapel's greatness in ways I cannot yet think to imagine."

"But Isaac is more contemporary, and surely the congregation will appreciate his contributions more than anything des Prez would be able to produce."

"It seems to me that this argument isn't about which composer you prefer in terms of music, anymore. Otherwise, you'd have given in a long time ago. What is this *really* about?"

"Des Prez just isn't *friendly* enough. Isaac is so much easier to get along with. Everyone whom he would meet would be gratified by the respect given to them. Isaac is also cheaper and more willing to do what he's told."

"I'd say I rather *prefer* a man with a bit of rebellion left in his heart. You're not going to convince me otherwise, so I suggest you drop it there and send a message out immediately. I want to hire Josquin des Prez."

And, just like that, Duke Ercole I of Ferrara had won that argument. Alfonso was a good assistant, but sometimes he just didn't *see* what a man truly needed to be successful. Ercole needed a good composer for his chapel in the prominent city of Ferrara, and it simply wouldn't suffice to have anything but the best. Josquin des Prez, as Ercole thoroughly believed, *was* the best.

Alone in his small office, on the night of the second of January, 1503, des Prez worked on another of his chansons, reluctantly labouring for Louis XII under the light provided by the small candlestick that rested upon his wooden desk. He didn't *dislike* working for the then-king of France, but it didn't particularly please him, either. The king had recently *forgotten* to pay des Prez's stipend, and des Prez was not enthralled with the fact that he had to write an entire motet (entitled, rather bluntly, "Remember thy promise unto thy servant") just to remind Louis that the payment was overdue. Des Prez was searching for more employment opportunities, so when he felt a cool breeze as the door to his office flew open, he was not hesitant to see who had interrupted his writing.

It was a messenger, with a small green envelope in his hand.

"For you, sir. This is a message from Italy."

Des Prez thanked the messenger and sat down to open the envelope. Its contents were intriguing to him, and he was excited to find that Ercole was offering him 200 ducats to move to Italy and write music for his chapel.

Under his new employer, des Prez wrote some very important compositions, changing the entire music style of the Renaissance ever so slightly with each piece. Many of his compositions



involved melodies that included multiple instruments and voices in the final sound. His influence with these new pieces was very important to the spread of similar music in the Renaissance. One of his more famous motets, *Miserere*, which was influenced by Girolamo Savonarola, was created while des Prez was in Ferrara.

Des Prez's stay in Ferrara was not as lengthy as he had originally hoped, however. Fear and death spread into Ferrara as an outbreak of the plague overtook the city's pesky rats (who quickly spread it to surrounding humans). Duke Ercole I had no choice but to leave his city behind, taking his family and the majority of his citizens with him. As it turns out, it is hard to successfully find payment when the city in which one is working is practically barren, so des Prez had no choice but to leave the city himself. He packed up his things and was gone by April of the following year, and part of his reasoning was most probably for the sake of escaping the plague and leaving its effects behind. After he left Ferrara, des Prez travelled to his home and lived the remainder of his life there peacefully, but still continued writing music. He spent the last twenty years of his life living comfortably and being acknowledged for his contributions to the music of the Renaissance.

My great-great-great grandfather's musical contributions were very important to both the Renaissance and modern-day music, and I think that anybody with a bit of common sense should be able to see that. The impact of his work on the Renaissance was immediately apparent: Heinrich Isaac, the alternative choice for Ercole I's chapel, based most of his music around innovation that des Prez was responsible for. I suppose it's a good thing that Ercole picked des Prez, because otherwise all of those great contributions that des Prez made would have ended up seeming rather ironic: his own work was what brought his downfall when being selected for the new job at the chapel. Des Prez inspired other musicians as well, and was one of the first to truly offer the experience of listening to multiple parts collide with each other as they overlapped melodies. After his work, music from the Renaissance was filled with individuality in regards to separate parts, and des Prez was clearly the milestone that made this transition possible.

This type of music still affects modern-day music. Listening anywhere, it's hard to find music *without* lots of intersecting parts. The most important thing about des Prez's music was the overlap of parts that made side-by-side interaction sound beautiful. When I listen to "A l'heure que je vous", I cannot help but feel proud that my own great-great-great grandfather was the one to come up with the beautiful melodies. It contains four simple parts, each playable by a novice instrument player. Still, the interactions among parts make it a very unique piece, even though it is only one insignificant chanson out of many. How did Josquin manage to write so many great music in his relatively short lifetime? It is an amazing thing to do, and des Prez was able to do it. Music will always contain melodies that work with each other, and it's amazing to think that Josquin des Prez was one of the true pioneers of this way of musical thinking.

Personal Narrative

11 February 2013

I had always known that marching band competitions were intense, but I did not expect them to leave as much of an impact as they eventually did. Others told me how much fun the competitions were, and that waiting to hear the scores was nerve-racking. Still, I hadn't expected to both love and hate the judging process as much as I did. Though the bleachers are cold, and the wind is harsh, the adrenaline produced during those few moments makes the entire season worth it.

This year's marching band season started in late summer, and it was my first. I was standing



in the footsteps of my sister, who had graduated the year before. The people around me had high expectations for my achievements, and I was definitely nervous on the first day. We, as a marching band, had been expecting to enter the season with two band directors: one who had worked with the band in previous years, and a new one whom we hadn't met yet. We were certainly surprised to find, on the first day, that our marching band would be led by two new directors, and that both of the old ones had left.

The previous year, the band had been very successful. It placed second in the state, breaking the school's record for the show's score at the final competition. With new directors, everyone was nervous. We were plunging into a new season without anything to back us up, and no one was sure how well it would go. Could we maintain our reputation from the previous year? Maybe it was stupid to worry about becoming the laughing stock of New Jersey's marching band world, but I definitely worried about it anyway. It wasn't that I didn't have faith in the directors, but I also didn't have much faith in the marching band's chances for the season.

In the early stages of the show, there was no way to tell whether it would fail or succeed. The directors seemed like they knew what they were doing, and during pre-band camp we managed to complete the first movement of our show, *New World Symphony*, successfully playing and marching it on the field. It was painful, but the knowledge that we were making significant progress was rewarding. We went into band camp with our heads held high, optimistic with the prospect of making even more progress over the course of the week.

Band camp was more than successful. According to some of the older members of the band, the previous year's band camp ended with the band only knowing about two thirds of the show. The trip was cut short that year because of Hurricane Irene, but the general consensus was still that we were making more progress on the show during band camp than the band did in 2011. We definitely got a lot done, progressing significantly more than we had expected. The band directors were content enough with our progress that they gave us more time to relax, loosening the intense training. By the end of the week, we had put the entire show on the field with music. It was ugly, but we had technically "finished" the show.

After a few more weeks of work, we went to our first competition. We performed well, earning the award for the competition's "Best Overall Effect". The entire marching band was proud of its success, and the result encouraged us to work even harder for our next competition. As it turned out, that hard work definitely paid off. In almost all of the subsequent competitions that we participated in, we earned the "Best Overall Effect" award that showcased our show's entertainment value.

Much like the previous year, our marching band season was shadowed by a nasty hurricane. Luckily, this time it occurred long after band camp, once we had mostly refined our show. Because of the hurricane, state championships were postponed a few weeks. We had a bit of trouble getting back on our feet after such a long period of not marching, but by the time the competition came around, we were ready.

The day of the competition, we arrived early in the morning to rehearse the show and make last-minute changes to perfect the exhibition. After loading ourselves onto the bus, we made our way to the state championships, adrenaline rushing through all of us. I won't forget marching onto the field with the knowledge that this single performance would determine the entire season's outcome. If we messed this one up, we threw out all of the work that we had done throughout the year.



We didn't, though. Our exhibition at the competition was the best we had performed all year. Sure, I made a couple of mistakes. None of us was perfect. We were proud of what we had done, though, and knew that we would place well in the judging.

Judging hadn't come yet, though, and as we walked off the field we knew that the next few hours would be spent in anticipation, unsure of how well we had really done. We moved up to the bleachers and watched the rest of the bands from behind. They were good, but were they as good as we? We really just didn't know. The suspense killed us, and we were surrounded by other bands who felt the exact same way as us.

The time to announce the scores eventually came, of course, and the bleachers on both sides of the field went dead silent. Sitting in the midst of such a large crowd of band geeks was kind of eerie, because everyone was focused on a single thing: finding out their score and rank. The announcer drew things out as long as he possibly could, but when there was no more time to stall, he started to announce the results of the last-place team.

We hadn't gotten last place. At least we had that much.

The announcer crept up the list, announcing the score and rank of each band. As he approached first place, we became more and more worried. Time ran slower and slower, and seemed to be at a dead stop by the time he reached fifth place.

"In fifth place, and with a score of 91.05," he announced, his voice unable to draw out the words any more, "Manchester Township High School!"

We, as a band, collectively released our held breaths. I almost didn't want to listen anymore. The intensity of the situation was overwhelming.

"In fourth place," he continued, "With a score of 92.7..."

I froze right there. Ninety-two point seven? But my sister had told me, the previous year, that the band broke the school's record with something around a ninety-two. That meant that, no matter what we placed now, we would have broken the school's record.

Still, there was no reason to believe that we had gotten fourth place. Why not hope for better?

"Delran High School!"

Perhaps it wasn't completely appropriate, but at that moment I almost vomited. I certainly hadn't expected to be as nervous as I was at that point. This was a big moment, though, and it meant a lot.

"In third place, with a score of 93.725..." the announcer went on. At that point, I was feeling pretty content--though still completely nervous--because we had already beaten last year's score by almost a full point, at the very least.

"Hightstown High School!"

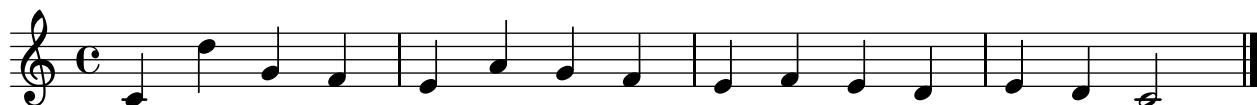
I released it all at that point. Everything that was stored inside me, everything that had been stored for the entire marching band season, spewed out of me like an uncontrollable geyser. Surrounded by sweaty band geeks, I joined with the deafening cheering that surrounded me.

We had made it. We beat our own record-breaking score, thanks to all of our hard work. In the beginning, we didn't have very much faith. There was no reason to believe that we'd succeed at all, with new band directors and a new school year. Still, we put effort into our work, determined to make it the best it could. That paid off in the end, and if we hadn't believed in ourselves we could not have made it to that one moment in which everything became worth it.



Grammatical Notations

Page	Location	Context
Pronouns: Case Usage		
7	pr. 2 of Reflection	"are not <u>mine</u> to observe"
12	pr. 2	"of an imprisoned noblewoman <u>who</u> manipulates"
1A	pr. 2	"less than a page of Candide's adventure to <u>his</u> experiences"
1D	pr. 10	"the person <u>whom</u> everyone wants to kill"
1D	pr. 10	"...to kill is <u>I</u> ."
25	pr. 6	"everyone <u>whom</u> he would never"
Pronouns: Correct Reference		
B	pr. 2 of Reflection	"a lot of options ... exactly which <u>one</u> I should take"
12	pr. 1	"Gender-related stereotypes ... <u>they</u> have been a large part"
12	pr. 2	"a young nobleman, d'Artagnan ... <u>he</u> leaves his house"
12	pr. 2	"Dumas emphasizes ... in others, <u>he</u> points out"
13-14	pr. 1	"This reference ... <u>It</u> sheds light on"
15	pr. 1 of "Thoughts"	"the portfolio ... <u>it</u> will be hard to perfect"
16	pr. 6	"Candide, a parentless bastard ... <u>he</u> discovers that Cunégonde"
1B	pr. 3 of WNB entry	"an attacker gains access ... <u>he</u> can log into anyone's account"
Pronouns: Correct Agreement		
8	pr.5 of "RSA"	"intricacies of the math ... have <u>them</u> memorized"
9	pr. 2	"a message, ... encrypting <u>it</u> "
A	pr.2 of Reflection	"all of the information ... I can't retrieve <u>it</u> ."
13	pr. 2	"Griet and Kitty both ... that <u>they're</u> respectively"
1A	pr. 5	"Sections and movements ... <u>they</u> can seem random"
26	pr. 3	"musical parts ... <u>they</u> overlapped"
Parallel Structure		
3	pr. 1	"for <u>forcing</u> ... and for <u>teaching</u> "
C	pr. 3	"have everyone <u>love</u> and <u>appreciate</u> "
13	pr. 2	"were both <u>undermining</u> ... <u>portraying</u> "
16	pr. 6	"Cunégonde <u>grows</u> ... and <u>lives</u> "
Subject-Verb Agreement		
1	pr. 5	" <u>I free</u> myself"
3	pr. 2	" <u>This is</u> not a great solution"
5	pr. 1	" <u>I wanted</u> to log in"
8	pr. 7 of "RSA"	"These <u>keys</u> can be represented"



Comma Use: Introductory Phrases

- | | | |
|----|---------------------|---|
| 2 | pr. 1 | " <u>Still</u> , Timothy finds himself content" |
| 5 | pr. 6 | " <u>Worse</u> , imagine this input" |
| 13 | pr. 4 | " <u>Indeed</u> , Chevalier does not bother" |
| 17 | pr. 3 of Reflection | " <u>When it's read correctly</u> , the meter" |
| 18 | pr. 3 | " <u>Yesterday</u> , a news report" |
| 19 | pr. 1 | " <u>Still</u> , it is ingrained" |
| 1E | pr. 7 | " <u>That way</u> , I'll seem useful." |
| 22 | pr. 4 | " <u>By itself</u> , a piezo element is essentially useless." |

Comma Use: Concluding Phrases

- | | | |
|----|---------------------|--|
| 2 | pr. 2 of Dedication | "is this God not a <u>concept, as well?</u> " |
| 8 | pr. 3 | "It's pretty <u>cool, which is why I wrote about it.</u> " |
| B | pr. 4 of Reflection | "or some <u>Creator, if you keep such a concept internally.</u> " |
| 1B | pr. 8 of WNB entry | "has some big <u>issues, though.</u> " |
| 1C | pr. 1 | "when a user logs <u>in, while a brute-forcer needs to compute billions.</u> " |
| 1C | pr. 3 of Commentary | "few <u>weeks, picking up where I left off each time.</u> " |

Comma Use: Interrupting Phrases

- | | | |
|----|---------------------|--|
| 12 | pr. 3 | "Griet's <u>dad, who is now blind</u> , is interested" |
| 12 | pr. 3 | "A young <u>butcher, Pieter, who</u> takes interest" |
| 13 | pr. 4 | " <u>Kitty, Milady's female maid</u> , is also referred to" |
| 15 | pr. 1 | "One of my <u>arguments, however, talks</u> about how" |
| 19 | pr. 2 | " <u>If, after reading this, you think</u> " |
| 19 | pr. 5 of Reflection | "accuse Hitler <u>of, relative to . . . people, is</u> prejudice" |
| 1B | pr. 6 of WNB entry | "that <u>will, provided an input, produce a hash</u> " |
| 21 | pr. 5 of Commentary | "The number ' <u>two</u> ', on the other hand, is very significant." |

Comma Use: Lists

- | | | |
|-------|---------------------|--|
| 4 | pr. 3 | "With columns " <u>username</u> ", " <u>email</u> ", and " <u>password</u> "." |
| 17 | pr. 2 of Reflection | "have written in <u>English, French, and even Haskell.</u> " |
| 1A | pr. 6 | "among <u>art, music, philosophy, and history</u> " |
| 21 33 | pr. 3 of Commentary | "it's <u>intuitive, useful, and fun</u> " |

Comma Use: with Conjunctions

- | | | |
|-------|---------------------|---|
| 2 | pr. 2 | "lies in computer <u>science, and</u> he interests himself" |
| 8 | pr. 10 of WNB entry | "in RSA <u>encryption, but</u> it is very" |
| 17 | pr. 3 of Reflection | " <u>notebooks, and</u> I felt kind of pressured" |
| 17 | pr. 4 of Reflection | "hard poem to <u>write, but</u> what might be the most" |
| 1A 26 | pr. 5 | "express in drawn <u>art, but</u> their expression is" |
| 1B 27 | pr. 2 | "care <u>about, so</u> I managed to make" |
| 1B 27 | pr. 1 of WNB entry | "at <u>anytime, so</u> you need to store" |
| 25 37 | pr. 7 | " <u>otherwise, so</u> I suggest you drop" |
| 26 38 | pr. 4 | "with each <u>other, and</u> it's amazing" |
| 27 39 | pr. 5 | "of its <u>success, and</u> the result" |



Modifying Phrase Placement

- | | | |
|----|-------|---|
| 1 | pr. 4 | "programming concept <u>that is discussed</u> " |
| A | pr. 6 | "elements <u>that are important</u> " |
| 14 | pr. 4 | "gender bias <u>that is likely deliberate</u> " |
| 22 | pr. 3 | "tones <u>that are produced</u> " |

Verb Tense Consistency

- | | | |
|----|---------------------|--|
| 4 | pr. 5 | "would <u>take</u> user input and <u>shove</u> it into" |
| 14 | pr. 2 | "The authors <u>portray</u> ... <i>Girl With a Pearl Earring</i> <u>emphasizes</u> " |
| 15 | pr. 1 | "the synopses ... <u>were</u> very generic, and <u>didn't</u> " |
| 17 | pr. 3 of Reflection | "I <u>wrote</u> this just because I <u>wanted</u> " |
| 1A | pr. 3 | "Philosophy both ' <u>pushed</u> ' and ' <u>pulled</u> '" |
| 1D | pr. 11 | "I <u>had misled</u> ... it <u>had become</u> necessary" |

Major Title Indication: Italicized

- | | | |
|----|---------------------|--|
| 3 | pr. 2 | "lessons prompted by <i>Sophie's World</i> were" |
| 7 | pr. 4 | "reading <i>Catching Fire</i> after" |
| 16 | pr. 1 | "Voltaire's <i>Candide</i> " |
| 16 | pr. 1 | "Chevalier's <i>Girl With a Pearl Earring</i> " |
| 1C | pr. 2 of Commentary | "in a <i>Dungeons and Dragons</i> campaign" |

Minor Title Indication: In Quotation Marks

- | | | |
|----|---------------------|---|
| 8 | pr. 3 | ""RSA Encryption" is about" |
| B | pr. 1 of Reflection | "inspiration for "Progress"'s title" |
| 17 | pr. 3 of Reflection | ""Maps" was an exception" |
| 1C | pr. 3 of Commentary | "I never actually finished "Silas"." |
| 1F | pr. 6 of Commentary | "a short story named "The Curse of Dimensionality"" |

Proper Title Format: First-Letter Capitalized

- | | | |
|---|---------------------|--|
| 4 | pr. 2 | "SQL, or <u>Structured Query Language</u> ," |
| 6 | pr. 4 | "In <u>French</u> ," |
| 7 | pr. 3 of Reflection | "come on, <u>Suzanne Collins</u> ." |
| D | pr. 1 | "by the <u>English Industrial Revolution</u> " |

