Gabrielle Sudik

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Professor Tamerlano

Lab

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Executive Summary

This lab will discuss software, including different kinds of productivity software and different operating systems. The lab will also include results of using new software for the first time (PIXLR and cloud-based storage systems) and explore some security and legal issues surrounding software as well.

Software: Operating Systems, ERP, CRM, SCM and The Cloud

An operating system manages hardware and creates the interface between the user and the hardware. It also provides a platform for software developers to write applications. Examples include Microsoft's Windows, Apple's OS X, and Linux. Productivity software (a subset of application software) are programs that do useful things for the user. Productivity software includes programs that allow people to write papers, listen to music, or calculate math problems.

Enterprise resource planning (ERP) software is used by businesses and is a centralized database holding all data for the organization. It is meant to take the place of overlapping and duplicitous software, which often contain similar data, and that are useful across different parts of an organization. For example, a master customer list that can be used to track advertising mailings, complaints, returns, and store credit cards. ERP systems were developed in the 1990s, in response to many large companies having too many disparate and unconnected application software and data. While it can take a couple of years for a company to convert to using an ERP, most organizations find that it helps their business to have all of their information in one large piece of software.

Customer relations management (CRM) encompasses software and databases covering all of a company's customers, and can be tailored to reach out to or track certain customers on an as-needed basis. For example, all women shoppers might be sent notice of a women's clothing sale; another part of the database and software might track customer complaints, and reach out to those customers in another way.

Supply chain management (SCM) is software that tracks the materials needed to make stuff, the final products, and all the steps in between. For example, SCM software can track what raw materials a company needs and where the materials come from; steps in the manufacturing process; where finished products are sent; and any other step in between those, such as tracking goods on ships or trucks. Each additional item, each additional source of item, each step in the manufacturing process, and each additional destination increases the complexity of the supply chain.

Enterprise computing is designed to allow an entire organization to use the same software and data. Using cloud-based storage and cloud-based applications can help streamline an

organization's computing in a number of ways. First, employees know they can access company data from anywhere with an internet connection. No more saving files to a disk or flash drive, or sharing via email. Data and documents are readily available to any staff that need it, even if they are traveling or working from another location. Second, installing and updating software can be easier if it is cloud-based. Employees will always have access to the latest version of software, because once it is updated in the cloud, it is updated for all users. In-house IT staff will not have to manually install the software or make sure it is up-to-date.

Android v iOS

Android and iOS are operating systems for mobile phones. IOS runs on Apple products and Android runs on non-Apple products. One of the biggest differences between the two is that Android allows for more customization, both in terms of what a user can do with the operating system itself, and in terms of what and how many apps are available for download. This has both pluses (like the ability to do more things with one's phone) and minuses (every app can be different, so there is a bigger learning curve; and updates to the OS may cause older apps to stop working, because there is less seamless integration among all the programs).

Android is open source software, which allows most anyone to create programs for it, and allows users to download programs from many sources, not just official ones. iOS is not open source. As a result, fewer people can write apps for it. In fact, all apps that are designed for iOS must be vetted by Apple first. While this can reduce the variety of apps, it also ensures apps have minimum standards, and they tend to be more compatible with upgrades to iOS than Android apps. As time goes on, however, the two systems are becoming more similar. People who know how to use one can easily learn to use the other.

To create applications for iOS, developers use Apple's Swift program. Developers for Android use Android Studio. Each system has a website dedicated to getting starting with how to create apps. The instructions/introduction for each system are generally the same: They provide step-by-step instructions for how to create apps for their respective platforms. Two things stood out to me, though, while browsing both sites. First, it appears that Android app creators have a lot more flexibility about what system they must use while creating the app. In other words, Apple requires that its apps be created using an Apple machine. I couldn't find a similar requirement/limitation for Android (if it's there, I missed it.). Second, I felt there was a big discrepancy in how clearly the instructions for each system were presented, with Apply clearly having better instructions. This was mostly due to the fact that Apple included Swift screenshots of what a designer would be seeing

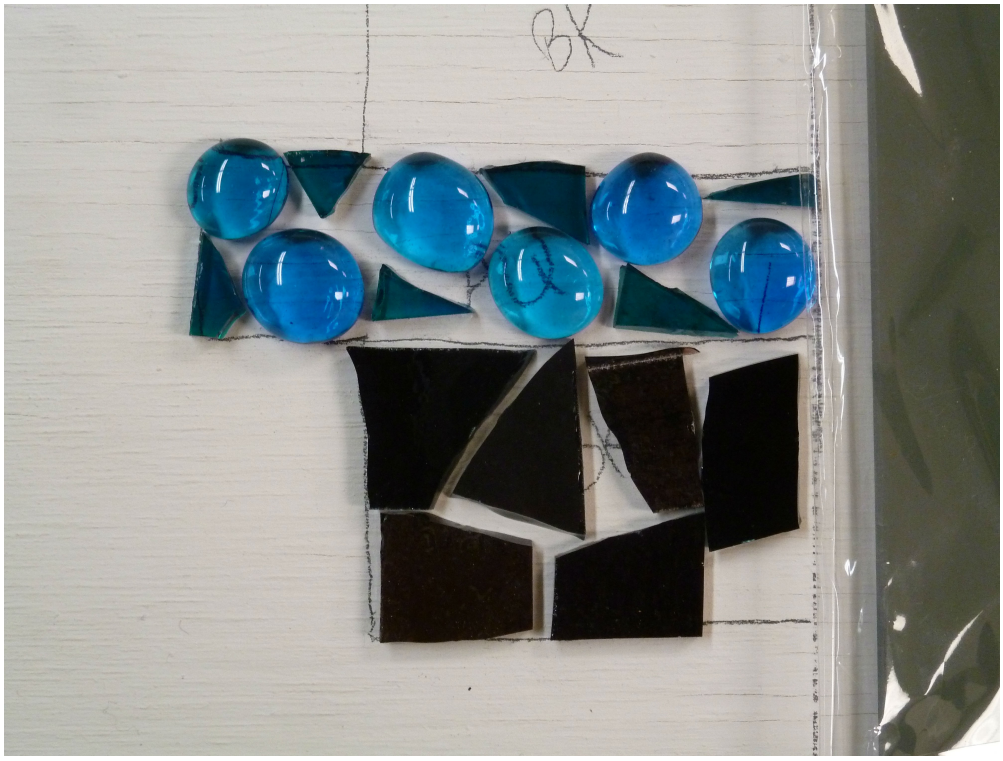
with each step of the development process. Although many people can follow instructions using only text, many/most people also benefit from visual instructions as well. This difference in the instruction manuals seems in keeping with the overall theme of “Apple products are really easy to use.” Note that my review and opinions on these two systems is based solely on skimming their instructions, and not on actually trying to build anything.

Virtualization

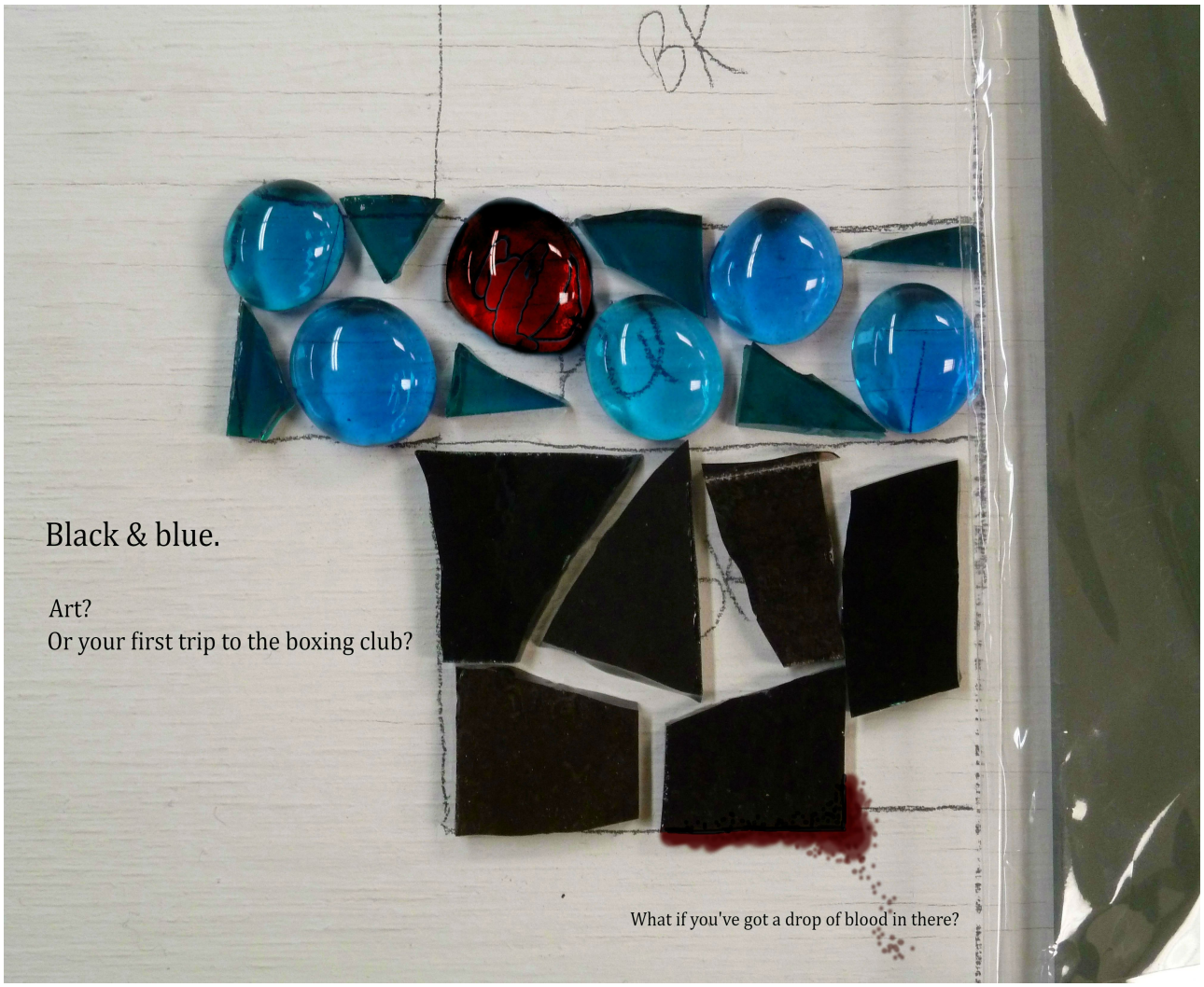
Virtual machines (VMs) allow the power of hardware to be used more efficiently, providing full power to all of a company's apps, but using fewer pieces of physical hardware. Software called a “hypervisor” ensures that all servers are running at peak capacity, reducing the number of servers but still providing the same productivity. This benefits businesses in a few ways: They can save money by buying or renting fewer servers, the equipment is simpler to manage, and maintenance is faster and less expensive (because there is less maintenance required).

PIXLR Photo Editing

Here is the photo that I started with. It's a close-up of a mosaic-in-progress, before I glued or grouted the tiles:



The first layers I added were the text (four layers, one for each line) and used the feature that recolors a section, turning one blue bead to red. I also used the lasso tool to block off the bottom right black rectangle, then a different coloring tool to add grades of red. Both varying hues and opacities and brush sizes, so the color was richer in some parts and gentler in other parts. Technically, using the lasso tool in conjunction with the color-adding tool was sort of just one new technique. But I like the finished result as a new piece of art, so I didn't want to add more just for the same of experimentation (I dabbled with some other effects, but nothing “looked right”). Here's the final:



SAFECode and Practices for Secure Development of Cloud Applications

SAFECode and the Cloud Security Alliance (CSA) partnered to identify security concerns related to the cloud, and ways to address the concerns. The two groups concluded that security measures that apply to computing generally also apply to the cloud, and that the cloud needs additional measures. They also concluded that cloud security involves the

same groups of people involved in regular security: Software developers, security architects, managers and IT staff (and presumably users, although the article was not explicit about this last group. More specifically, SAFECode and CSA found that the cloud was subject to these extra needs: (1) Data needs to be protected while in transit to the cloud storage and while in the cloud. (2) The interface software between the users and the cloud must be secure. This can be extra sensitive as there are often multiple APIs between a user and data, and users often extend APIs beyond their original use. (3) Denial of service attacks can happen at multiple levels in the cloud: At virtual machines, memory, disk space, network, database tier, etc. The more layers there are to the cloud, the more possible targets of a DoS attack, and an attack on any one layer can bring down the whole system. SAFECode and CSA suggest some possible ways to guard against DoS attacks, including load balancing, traffic management, active failover, scaling, and backup.
[There is a lot more to the article, covering topics like multiple users sharing space on the same server; the concept of storing more sensitive data "closer" to its origination point (ie, not in the cloud at all); and details on encryption and security tools. I could probably write several pages summarizing the article, but I'll just leave this as-is.]

The World Trade Organization and the Standardization of Intellectual Property Laws

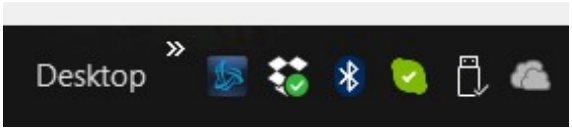
The World Trade Organization would treat the visual image I created above (and the underlying mosaic, which I also created) as my intellectual property, and would recognize I have a copyright on them both. Under US law, this means I control who can and cannot use my work (with some fair use exceptions) and I can also control who can profit from my work. The role of the WTO in intellectual property – in particular, the TRIPS Agreement – is to ensure that there are some minimum standards in all countries for the protection of intellectual property – copyright, trademark and patent – and it works to make those standards more similar as well. So my work will have legal protection in other countries, too, and I can be fairly certain the other countries will treat me work more or less like the US treats copyrights here.

Cloud Computing and Document-Sharing Software

I've been using Google Docs for years, so I decided to try a new file-sharing service for this lab, and chose Dropbox. It's very simple to use: just save a file in a certain folder in your computer, and it will also automatically save in Dropbox. (With Google Docs, I believe one must save a document twice to have both a cloud-based copy and a hard drive copy.). One

thing that makes Dropbox less useful than Google Docs is you need to download an actual program to use it. So if you're using a computer that blocks .exe files or downloads (like my computer at work), you cannot use the program. Google Docs is web-based, so nothing new has to be downloaded or installed. Another way I prefer Google Docs is its base program seems to give more control over who can see documents and who can edit. Dropbox appears to require that receivers of documents also get a Dropbox account, and I don't think Google Docs requires that. I will play around with Dropbox some more before I make a final decision as to which I prefer. And ever since I got Windows 10 on my home computer, it's been bugging me to try OneDrive, so maybe I will try that too.

And… annoyingly, I cannot use Snipping Tool to take a screenshot of my Dropbox menu on my toolbar, because it closes if I open the Snipping Tool. I hope this little screenshot of my task bar will suffice, coupled with me sending a copy of this document to you via Dropbox. (As you can see, I have OneDrive, too, but I've never used it.)



Conclusion

In this lab, I compared a variety of software, including operating systems for mobile phones and several different productivity software applications. I experimented with two new programs – PIXLR for photo editing, and Dropbox for file-sharing – and discussed how WTO intellectual property standards help protect my work. I also discussed some benefits of the cloud, as well as security concerns particular to the cloud, and the advantages of using virtual machines to help businesses.