

ANOTHER EXPERIENCE IN E-LEARNING

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Since its announcement in 2011, *Coursera* has proved to be a valuable source of on-line education. This entrepreneurship organization partners with the top universities in the world to offer courses online for anyone with an Internet connection to take, for free. Their technology enables the best professors to teach hundreds of thousands of students at the same time. The courses offered by *Coursera* cover a wide range of topics, from Humanities, Medicine, Biology, Social Sciences to Mathematics, Business, Computer Science, and many others.

Provided that my domains of interest are Information Science and Computational Linguistics, *Coursera* seemed like a perfect opportunity to better myself in these areas and to gain knowledge pertinent to these disciplines. The CS101 Stanford course via Coursera immediately grabbed my attention as it teaches the essential

ideas of Computer Science and provides a general background on computers today. No previous experience is required other than the ability to use a web browser (as everything works within the browser, and there is no extra software to download or install). The course uses small coding experiments to play with the nature of computers, understanding their strengths and limitations.

After several delays, the course started on April 23rd 2012. It was 6 weeks long, with a workload of 3-5 hours a week. The lecture videos lasted anywhere from 5 minutes to 30 minutes, and there were 4-5 video lectures offered each week. This course was taught by Professor Nick Parlante, who teaches Computer Science at Stanford. Each week, there was a set of lecture videos and a set of questions and/or coding assignments that we were

supposed to go through. The exercises could be done many times over, if anyone wished to get a perfect score and to practice their newly acquired skills. Lecture videos could be watched online on a laptop/desktop, on tablet devices or on mobile phones. There was a possibility to download lecture videos to all of the aforementioned devices if students wanted to watch them later or to keep a record of what they've been learning. The only downside to downloading lecture videos was that we couldn't complete the in-video quizzes that way – those could only be done while watching the videos online.

is Professor Parlante's research area). Professor Parlante made sure to explain all of the basics of JavaScript so that anyone could continue learning it on their own pace after the course.

Week 1 of the CS101 course brought four lectures, the first one being *Introduction to Computing Principles*, where we could take a look at the basic features of computers and start playing with computer code. Along with each video lecture, there was a written document with explanations, diagrams and code examples. The *Toggle* button, which makes it possible to switch back and forth between the video and its document to



Figure 1.

The computer language used in this course is a custom JavaScript (a Nick-CS101 variation of JavaScript) that is 90% standard with 10% Nick additions. The code environment is specifically set up to remove lots of context and so-called overhead code, so students can do experiments with just 10 most interesting lines of code (which

review explanations and try the coding examples yourself, was very useful. By the end of Week 1, we got introduced to *Variables*, *Digital Images* and *Image Code*. Week 2 was reserved for *For Loops*, *Expressions*, *Puzzles* and *Grayscale*. In Week 3, Professor Parlante taught us about *If Logic*, *Blue-screen*, *Hardware*, *Bits and Bytes* and *Hard-drive*.



Figure 2.

Building on the earlier image manipulation and logic sections, *Bluescreen* special effects exercise was particularly interesting. This special effects technique is commonly used for weather forecast broadcasts, wherein the news presenter appears to be standing in front of a large map during live television newscasts, though in actuality it is a large blue or green background. For this exercise, we were given two .jpg images (leaves.jpg with leaves in it and stop.jpg with a traffic stop sign in it) and the task was to detect colored area in one image (e.g. red in stop.jpg) and to substitute those pixels with pixels from the other image (leaves.jpg). In order for this exercise to be done correctly, we were to consider for each red pixel of the stop sign image the pixel at the same position (x,y) in the leaves image. Then, we were to copy over the pixel from the leaves image to the stop sign image by copying over the red, green and blue values. The solution code for

this exercise was as follows:

```

image = new SimpleImage("stop.jpg");
back = new SimpleImage("leaves.jpg");

for (pixel: image) {
  avg = (pixel.getRed() + pixel.getGreen() +
  pixel.getBlue())/3;
  if (pixel.getRed() > avg * 1.5) {
    x = pixel.getX();
    y = pixel.getY();
    pixel2 = back.getPixel(x, y);
    pixel.setRed(pixel2.getRed());
    pixel.setGreen(pixel2.getGreen());
    pixel.setBlue(pixel2.getBlue());
  }
}
print(image);

```

When run, it gave the result shown in Picture 2, the stop sign looking like it had leaves in the background instead of the usual red color.

In Week 4, we learned about *Software, Networking, TCP/IP and Table Data*. In Week 5, we got introduced to *Strings, Boolean Logic, Count I and II* and *Analog vs. Digital*. In the final week of the CS101 course, Week 6, we learned about *Digital Media, Security and Algorithm vs. Code Bugs*.

Along with the lectures and exercises, we were also given the Image Functions Reference, with all the JavaScript functions needed to complete the exercises, as well as the RGB color explorer, which lets you play with the RGB scheme, combining red, green, and blue light to make any color. The sliders control the red green and blue lights, each ranging from 0 (off) to 255 (maximum). The intersecting rectangles show the result of adding the red, green, and blue light together. For example: all three values at maximum (255) → white, all at minimum (0) → black, red + green → yellow, red + blue → purple.

As is the case with most of the courses offered by *Coursera*, students could exchange opinions and experiences through forums and study groups designed specifically for them. The only rule was that no one was allowed to give complete answers or solutions to coding problems, only hints were allowed. Students also used the CS101 Facebook page. I didn't use the forums often, but I did find consolation on one of the forums when one of my coding solutions just couldn't be validated. With a little help from my fellow students, I found out that my solution was correct – I just needed to switch to a different browser for the course.

There was no exam at the end of the course, but to pass the class, everyone needed to get 80% or better net across all the exercises. Many people worked to get 100% on the exercises, myself included, since no limitations on how often students could try to complete the exercises were set, and it was plausible to keep working on them until they were perfect. The course page is still

available on the *Coursera* site and all existing accounts are still there and work. There is a plan to put the course in a self-service mode, where anyone new can sign up and use the materials and go through them at their own pace, but without the Statement of Accomplishment at the end.

Overall, the course was very successful, mainly thanks to Professor Nick Parlante. The overpowering sentiment of this course was the ease with which most of the students were able to grasp new concepts and the talent of professor Nick to teach those concepts to a various range of students, from high school students pondering on what they should choose for their majors when they start college, to housewives with some extra time on their hands. Most students, myself included, came to a conclusion that Nick Parlante could probably teach us anything, preferably a more advanced course in Computer Science.

More world renowned universities joined *Coursera* recently. More than 100 courses will be offered, from Professor Dan Ariely's course on irrational behavior, to learning how to program in *Scala* (taught from the creator of *Scala*, Professor Martin Odersky), to the legendary course "*How Things Work*" with Professor Louis Bloomfield. From Gamification, to Statistics, to Modern Poetry, to Big Data, to Social Network Analysis and more, there is plenty to choose from. As always, the most current course list can be seen on the *Coursera* site (www.coursera.org), and keep in mind that you can enroll in a class even if the start date is to be announced (TBA).

One of the very first courses offered by *Coursera* was the NLP (*Natural Language Processing*) course taught by Daniel Jurafsky and Chris Manning. This course seemed very interesting to me, and I did sign up and started following the course lectures, but I soon realized that it was too difficult for me, as I didn't have enough computer programming background, and one of the requirements was to be able to code using

Java or Python programming languages. Therefore, my plan is to learn Python, the programming language that has become very “popular” as it is fairly easy to learn and a nice start for beginners in programming. *Coursera* announced a Python course which will be offered in October this year. Its title is *An Introduction to Interactive Programming in Python*. The beginning of this course is planned for October 15th 2012, it will be 8 weeks long, with a workload of 7-9 hours per week.

Opportunities for bettering ourselves through e-learning have become numerous and there is so much to choose from. Everyone should try at least one of these courses, as they are a great opportunity for personal improvement and a chance to get a glimpse of what it’s like to study at one of the world’s greatest universities. These learning experiences do not provide us with any university credits or points. Still, a Statement of Accomplishment from one of the world’s most renowned universities should speak for itself and any employer will appreciate the fact that you made an effort and wanted to learn something new. It is certainly a nice addition to any CV.