

COMPUTER SCIENCE E-1

Understanding Computers & the Internet

PROBLEM SET 5

Due Monday, April 1 at 5:30pm

15 questions, out of 41 points

Academic Honesty

All work that you do toward fulfillment of this course's expectations must be your own unless collaboration is explicitly allowed by the staff. Viewing, requesting, or copying another individual's work or lifting material from a book, magazine, website, or other source—even in part—and presenting it as your own constitutes academic dishonesty, as does showing or giving your work, even in part, to another student.

Similarly is dual submission academic dishonesty: you may not submit the same or similar work to this course that you have submitted or will submit to another. Nor may you provide or make available solutions to homework or exams to individuals who take or may take this course in the future. Moreover, submission of any work that you intend to use outside of the course (e.g., for a job) must be approved by the staff.

If in doubt as to the appropriateness of some act, contact the staff. All forms of academic dishonesty are dealt with harshly.

Submission Instructions

To submit this problem set, head to E-1 Submit (<http://cse1.net/submit>), where you can upload a PDF, Word Document, or text file in addition to the graphics you created. PDF files are preferred, but do be sure to submit images separately if indicated in the question!

#COFFEE

1. (2 points) Why do filenames have extensions? Does a file need to have an extension to be opened? Why or why not?
2. (3 points) What's the difference between additive and subtractive color mixing? Give an example of a set of primary colors that can be used for each.
3. (2 points) What is the color depth of a black-and-white, monochrome image?
4. (3 points) What colors do the following color codes (given in RGB) represent?
 - i. #F08080
 - ii. #B0E0E6
 - iii. #COFFEE

New Year's Resolution

5. (3 points) Why might a website want to create both low-resolution and high-resolution versions of its logo? What are the advantages of a low resolution logo, and what are the advantages of a high resolution logo?
6. (3 points) What's the difference between lossless compression and lossy compression? Give an example of a file format that uses each.
7. (2 points) Why is it that vector graphics scale to larger sizes so nicely, but raster graphics do not?

Sound Off

8. (2 points) How do amplitude and frequency affect sound?
9. (3 points) Describe the process of converting from analog sound to digital. How do both sampling rate and bitrate come into play in this process, and what's the difference between the two?
10. (2 points) I have an audiophile friend who just spent another \$100 on a new hard drive because he refuses to listen to anything but PCM audio. He says he can always tell the difference between PCM and MP3. Even though MP3 files are a fraction of the size of their CD-quality equivalents, why might my friend be going a bit overboard?

Another Dimension

11. (2 points) What's a wireframe? Describe how we use wireframes to represent objects in 3D space.
12. (2 points) Homer went to download a mesh of a doughnut, but the file he downloaded looks more like a box. D'oh! Lisa says that he shouldn't worry, though, because the mesh he downloaded will work just fine. Why?
13. (3 points) What's the difference between a container and a codec? Give an example of each.

Graphic Designer

14. (4 points) Try seam carving some of your own photos! It's really cool. If you don't have any photos of your own, feel free to download some from the Internet. Content-aware scaling is available in both Photoshop (<http://www.adobe.com/products/photoshop.html>) and as a plugin for the GIMP (<http://www.gimp.org/>), but you can also just download the Seam Carving GUI (<https://code.google.com/p/seam-carving-gui/>). Images with lots of empty space in the horizontal or vertical directions will produce the best results. Submit both the original photo and the seam carved version, and try to scale the image by at least 10% of its original width or height. In a short paragraph, tell us about your experience! Which parts of your image(s) had low energy?
15. (5 points) Now, it's time to create some multimedia of your own! First, you'll want to download Photoshop, GIMP, or any other image editor of your choice. If you've never done graphic design before, check out this week's section videos, available at <http://cse1.net/sections>. There are lots of free Photoshop and GIMP tutorials on the web as well!

Now, let's make an E-1 souvenir! Design a graphic inspired by E-1 that is suitable for print on a T-shirt, mug, or any of the products listed at <http://www.cafepress.com/make/personalized-gifts>. For example, you might want to create a fancy logo, a clever pun, or something along the lines of "I Survived Computer Science E-1!" Once you've come up with an idea, read the Cafepress Beginner's Tutorial at <http://www.cafepress.com/cp/info/help/index.aspx?page=images.aspx>, and check out the starter files at http://www.cafepress.com/cp/info/sell/index.aspx?area=images&page=help_templates to get a sense of how large your image should be.

Submit both your original file (as a .PSD or .XCF), as well as a .PNG. In a short paragraph, tell us about your design and your experience making it! Next week, we'll compile everyone's submissions into a gallery, and you'll be able to purchase items designed by you and your classmates! If you'd prefer that we don't upload your image to Cafepress or you wish to remain anonymous, that's totally fine! Just let us know on your problem set submission.

If you'd like to create something that mimics the course's own design, E-1's main heading font is League Gothic, the subtitle font is Sorts Mill Goudy, and the body font is Adobe Caslon Pro.