Problem 1.4.7

Image Artist

Introduction

Digitized images become a larger part of our lives every year. Consider

- magazines and websites,

- movies and TV,

- security cameras and satellite images,

- astronomy telescopes and climate satellites,

- MRIs and X-rays, and

- fine art to 3D print.

Image courtesy Rolfes ©2004

Computers
produce, analyze, and manipulate
more and more
of what we see in the world.

How will computation change your visually creative work?

Materials

- Computer with Enthought Canopy distribution of the *Python*® programming language

- Webcam or other way to obtain a digital picture

- Internet access to obtain images

Resources

Procedure

1. Form pairs as directed by your teacher. Meet or greet each other to practice professional skills. Set team norms.

2. Choose a problem following the constraints introduced by one of the clients below. Define the problem and review the criteria from the rubric for the problem.

   - Document thoroughly. Starting with this problem definition, record your work in a bound design project notebook. Use unique names to save successive versions of *Python* files in the code editor prior to each set of major changes. Comment out and annotate abandoned code so that you retain a record of what you tried that did not work.

   - Brainstorm to generate ideas.

3. Develop one of your ideas to create a proposal for the client. Get client feedback before digital production.

4. Develop the product.

   - Review each member's understanding of navigator and driver roles.

   - Strategize, code, and test. Your record of your development process is an important artifact. A reminder of some tools you can use.:

     - Use unique file names to save successive versions of *Python* files in the code editor after each significant success.

     - While working toward each success, retain a record of what you tried that did not work, perhaps by commenting out and annotating abandoned code.

- Retain information about your development process by saving the IPython session history or by using the IPython notebook.

- Use GitHub or another method for version control to retain successive versions that document your code's progress at various milestones.

- Keep a project notebook with dated, numbered pages summarizing your work each day.

- Include notes about the problems you encounter, what you tried that did not work, and how you solved each problem encountered along the way.

5. Prepare deliverables. Prepare your artwork to present to your client. Your work should include all of the following components documenting your collaborative product.

- A visual display comparing the images used as input to those produced as output by your algorithm

- Credits for raw images used as input or as part of your algorithm

- Sketch of proposed idea

- Visual display of raw images used in the algorithm

- Sequence of images showing stages of manipulation reflecting intermediate stages of data during the algorithm's execution

- Array of images showing results from a range of values for a parameter of the manipulation

- Practice Opportunity for the *Create* Performance Task

  Pick one of the two previous deliverables to write about. "Describe the purpose of your program and describe what the sequence of images illustrate. (Approximately 150 words.)" (adapted from College Board Create Performance Task Part 2a.)

- Practice Opportunity for the *Create* Performance Task

  Describe the incremental and iterative development process of your program, focusing on two distinct points win that process. Describe the difficulties and/or opportunities you encountered and how they were resolved or incorporated. (Approximately 200 words) (adapted from College Board *Create* Performance Task Part 2b.)

- Practice Opportunity for the *Create* Performance Task

  Your algorithm for iterating over images combines the procedures and methods (i.e. algorithms) that you used from the numpy or PIL libraries. "Describe how each algorithm within your algorithm functions independently, as well as in combination with others, to

form a new algorithm that helps to achieve the intended purpose of the program. (Approximately 200 words)" (adapted from College Board *Create* Performance Task Part 2c.)

- Practice Opportunity for the *Create* Performance Task

  Explain how abstraction helped manage the complexity of your program. (Approximately 200 words) (adapted from College Board *Create* Performance Task Part 2d.)

- Practice Opportunity for the *Create* Performance Task

  Paste your previous four responses into a new document and clearly label them 2a through 2d. Use screenshots to capture your entire program code, and paste the image(s) into the document, labeling the images 2e. Draw an oval around the segment of code corresponding to the algorithm of algorithms you described in deliverable (ix). Draw a rectangle around the segment of code corresponding to the abstraction you described in deliverable (x). Save the document as a PDF. (adapted from College Board *Create* Performance Task Part 2e.)

Note: This last five deliverables are adapted from the official College Board Create Performance Task but they do not duplicate the content of College Board Task or Rubric. The tasks provided here contains elements that are different than the College Board Performance Task and Rubric. Please reference official College Board materials.

Conclusion

1. Alice and Barb have different ideas about what a "manipulated image" is. Decide whether you think that each of them is right, wrong, or somewhere between. Write an argument in support of your ideas.

   Alice: "All images are manipulated. For one thing a camera is sensitive to certain kinds of light and the developer controls the exposure level. Even our human eyes have a limited number of pixels! There are 'only' 120 million rods and 6 million cones in each retina, so our vision is pixelated just like a digital image. And our vision is also highly processed – even the blind spot in each eye gets filled in. Out of all those millions of light detectors, only about 1 million ganglia neurons go from the eye to the brain. There is no such image as seeing the 'real' thing."

   Barb: "Of course there is a real image. Certain kinds of manipulations are accurate and others tell lies."

2. Under what circumstances is an image yours to use? Yours to distribute? Yours to sell? Write about your thoughts on this question in the context of downloaded images and images you take with a camera.

3. Reflect on the team dynamic and on the design process. What were areas for improvement? What steps could you take next time to make those improvements?

Problem 1.4.7 Statement

Client # 1: A Cause

Your client is a group that advocates for a political cause. It could be the environment, education, anything. The client needs a consistent branding for images that will be used to promote their cause – images that are memorable and will have a lasting impact on people. The client could be a real or fictitious student organization, community group, or state/national/global advocacy group. The client's cause should be a true potential cause even if the client is fictitious.

The client wants an automated process to apply to images. They want the process to use some combination of masking, shading, or combining the images with a consistent logo or superimposed image. The client enjoys abstract art as well and might like geometric shapes incorporated in the image – drawn on, as a border, or as a mask.

The client enjoys participating in the creative process and will appreciate being offered a range of options (as a parameter) for one of the image operations you perform.

Client # 2: A Family

Your client is a family that would like a standard frame applied to a large number of pictures that feature one or more of the family members. They want the composite image to be memorable and to incorporate some personalized symbol, image, or silhouette that represents the interests of the family member(s). The client enjoys abstract art as well and might like to see geometric shape incorporated in the image–drawn on, as a border, or as a mask.

The client enjoys participating in the creative process and will appreciate being offered a range of options (as a parameter) for one of the image operations you perform.

Client # 3: A Product

Your client is a company that manufactures or distributes a product. The client needs an image that is memorable and has a lasting impact on people to increase sales or brand loyalty to their product. This could be a real or fictitious product.

The client wants to be able to apply their brand image as a frame, overlay, or silhouette to a large number of images to be used in the marketing campaign. The client enjoys abstract art as well and would like to see geometric shape incorporated in the image–drawn on, as a border, or as a mask.

The client enjoys participating in the creative process and will appreciate being offered a range of options (as a parameter) for one of the image operations you perform.

Client # 4: A Developer

You work for a software company that is producing a photo editing tool similar to Photoshop® software. The selling point of your flagship product is a large number of detailed algorithmic photo

manipulations. Your team is to create a script to manipulate images into one composite in a unique way, ideally one not possible through simple Photoshop workflow.

Your team wants the end product of the manipulations to be a photomontage made from at least two distinct original images. They believe that an exciting feature will result if you surprise the user by allowing them to combine two images that do not naturally occur together, especially if one of the images is then changed in some way to emphasize the effect of the combination. You know that your geometric patterns often are a selling point of your software, so your team is also considering how to incorporate geometric shape into the image – drawn on, as a border, or as a mask.

Since this script will work as part of a cohesive software package and you have no way of knowing in advance what images a user is going to choose to manipulate with your company's product, you cannot make any assumptions about the images that you will have to work with. However, your team plans to offer a range of options (as a parameter) for one of the image operations you perform to allow the user to customize the operation.

Problem 1.4.7 Image Artist Rubric – Option A

	4	3	2	1
Solves problem	Artifact fully addresses personal, practical, or societal intent posed by problem statement	Artifact addresses the personal, practical, or societal intent posed by problem statement	Artifact partly addresses the personal, practical, or societal intent posed by problem statement	Artifact does not address the personal, practical, or societal intent posed by problem statement
Documentation	Uses appropriate techniques for documenting work: Inline comments Multiline comments Project Design Notebook Named versions of code	Mostly uses appropriate techniques for documenting work	Often uses appropriate techniques for documenting work	Does not usually use appropriate techniques for documenting work
Collaboration	Provides substantial original input to others Promotes positive, productive, and respectful team dynamic Encourages and incorporates input from others Promotes equitable workload	Provides significant input Usually promotes positive, productive, and respectful team dynamic Receives input from others Shares workload equitably	Significant but limited input Sometimes promotes positive, productive, and respectful team dynamic Mostly receives input from others Shares workload somewhat equitably	Limited input Is not promoting positive, respectful, or productive team dynamic Discourages or is unresponsive to input from others Does not promote equitable workload
Presentation	Attractive and well-organized poster	Sufficiently attractive and organized poster	Mostly attractive and organized poster	Poster is sloppy or poorly organized
Appropriate Algorithm	Code demonstrates use of appropriate algorithms	Code generally uses appropriate algorithms	Code mostly uses appropriate algorithms	Code does not use appropriate algorithms
	Prose clearly and		Prose mostly	Prose

Explanation of Process	thoroughly explains the computing process used to generate the image	Prose explains the computing process used to generate the image	explains the computing process used to generate the image	insufficiently explains the computing process used to generate the image
Explanation of Problem Solution	Prose clearly and thoroughly explains how the solution meets the need. Prose clearly explains the solution's strengths and weaknesses and strategizes for improvement.	Prose explains how the solution meets the need. Prose explains a strength or weakness.	Prose mostly explains how the solution meets the need. Prose mentions a strength or weakness.	Prose does not address how the solution is connected to the need.

Other comments: