Unversity of London International Programmes
Creative Computing I : image, sound and motion
Coursework assignments 2016-17

Introduction

The following assignments are an opportunity for you to obtain a broader and deeper understanding of the material in this unit.

Completed courseworks are to be uploaded to the VLE for submission. In general:

- essays and discussions must be in the form of a PDF.
- any *Processing* sketches should be in a ready-to-run form including any appropriate `data` folder; and
- it is essential that you comment any code that you submit.
- you must submit all your work -documents and code- in a single .zip file as detailed in the submission instructions at the bottom of this coursework.

Before you submit your files, be very sure to check that you can successfully unpack them and that they contain all of the files required; we recommend you try unpacking them in an empty directory on your computer, and try running the files in *Processing* from there to check that they work.

Please do not use any spaces or unusual characters in your filenames; only use the format explicitly asked for in the submission instructions.

A note on copying code from other sources: It is a normal aspect of programming to look at other people's code to get inspiration on how to solve a problem. This might extend to directly copying code obtained from elsewhere into your own program. If you do this, you should include a comment in your code to say which part has been copied, and where it came from. This is good practice whenever writing code, to acknowledge the original author. Note, however, that you will gain *much* more out of the courseworks if you write all of the code yourself (after reading the appropriate sections of the Subject Guide and other sources), rather than copying code from elsewhere. That way, you can be sure that you really understand what the code is doing! In addition, writing all of the code yourself will usually obtain higher marks for you than copying code, and a submission that mostly contains copied code is unlikely to obtain a pass mark.

For each code file that you submit, do the following:

- Include your name and SRN in a comment at the top of the sketch.
- Specify which version of *Processing* you have used to code the sketch, also in a comment directly below your name and SRN.
- Include an appropriate number of comments in your sketch to explain what it is doing.
- Place the `.pde` file in an appropriate folder, together with anything else that has been requested, and also together with any other files that are needed in order to run the sketch.

CO1112 Creative Computing 1: Assignment 1

Aims

The aims of coursework assignment 1 are:

- To introduce you to doing reading and writing in an appropriate academic context, including presenting coherent argument.
- To begin to develop your practical experience of programming using *Processing* .
- To develop your knowledge and understanding of shape, structure and colour.
- To give you the opportunity to combine various techniques you have learned about during the course to produce a creative artefact.
- To develop your experience of research and referencing.

Part 1: The art of Carmen Herrera

The work of Cuban-born artist Carmen Herrera is primarily abstract (with some exceptions) and contains a strong element of shape and of colour. For this part of the coursework, you are to find out about this artist and her work, and to relate her approach to the Bauhaus principles of shape, form and colour. As well as reading the appropriate chapters of Volume 1 of the subject guide (primarily Chapter 2, but also the chapter on shape), you should find out about Herrera's work. You may also need to read more broadly than the subject guide to find appropriate material about the Bauhaus, shape and colour.

You should submit an essay, called `HerreraEssay.pdf`, that describes the work of Herrera, and your discussion of the links to the Bauhaus. Your essay should be between 500 and 1500 words, with appropriate citation and reference. It is essential that it is not simply a serial summary of the material you find, but that it also includes your own take on the links with Bauhaus (and related) concepts.

[30%]

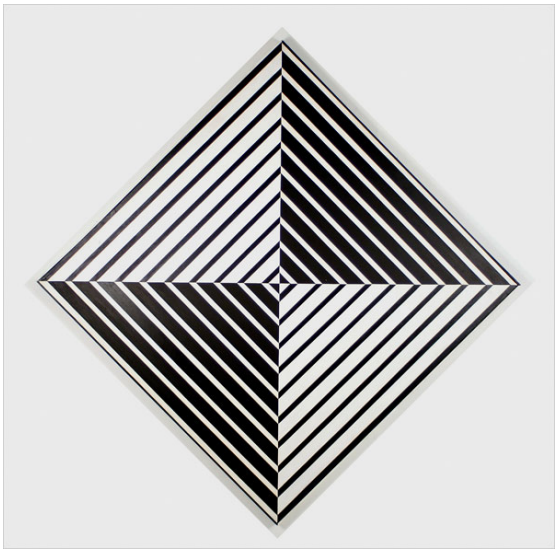


Figure 1: Carmen Herrera's 1952 work, *Black and White*

Part 2: Shape

This part of the coursework involves a practical implementation, using *Processing* . You are to develop a sketch that produces a reasonable representation of the 1952 Herrera work, "Black and White", shown in Figure 1. Think about appropriate sizes to use for the sketch, and also think about how to make the code efficient and elegant, as far as is possible.

Chapter 6 of Volume 1 of the subject guide discusses shape, and contains code that produces a representation of a Mondrian work. You may wish to consider whether or not this is a good starting point for this piece, or whether it is possible to approach it in a more elegant way.

You should save your commented code in a file called `BAndW.pde`.

[12%]

Part 3: Colour

Read the material in chapter 1 of Vol 2 of the subject guide, particularly about colour schemes. Also read more broadly if you need to, to obtain a broad grasp of the concepts of colour theory and colour schemes. Using this knowledge, choose **one** of the Herrera works on the last page of this assignment, and use it as a basis with which to explore aspects of colour, in a *Processing* sketch.

For this part of the coursework, you are to develop a sketch that broadly reproduces the work you have chosen, and save this in a file called `HerreraSimple.pde`. Make it clear in the sketch which of the Herrera paintings you are reproducing. Play about with colour in this sketch a bit, using the information you've obtained in your reading, and produce (and save to named files) two different output images that show the sketch with different colour aspects. Include the saved images as part of the folder containing your sketch, in a subfolder called `Outputs`, and also include in a comment section at the start of your code a brief description of why you made the colour choices you did.

[12%]

Part 4: Extended exploration

Extend your sketch from Part 3 so that you are creatively working with colour and shape. You may include an interactive aspect, or an animation aspect if you wish, or you may investigate colour or shape more deeply. It is acceptable for the extended exploration to have nothing of the original sketch in it, as long as the connections with the original sketch, and the motivation for the extensions, are clear. The more creative or technically challenging your work, the higher the marks you will obtain for this part, but it is essential that the creativity or technical work is clearly linked to the brief given here.

Do not simply add things like animation or sound, just for fun, or 'to add interest'. Anything you include, and your extension, must be for a reason, and the reason must be connected to the requirements of the coursework.

The sketch should be called `Exploration.pde` and you should include this in a folder that also contains any other material needed to run the code.

[36%]

Explain your motivation for how you have extended the work, and also a critique of its effectiveness or impact. Discuss the colour or shape exploration that you've done, and include a brief mention of things you could have done better, or other ways the work could be extended in the future. This part is to be submitted in a pdf file called `Report.pdf`. There is no set length for this report, but you should make sure you include all that has been asked for, without padding it out with unnecessary material.

[10%]

Submit the following by uploading to the VLE:

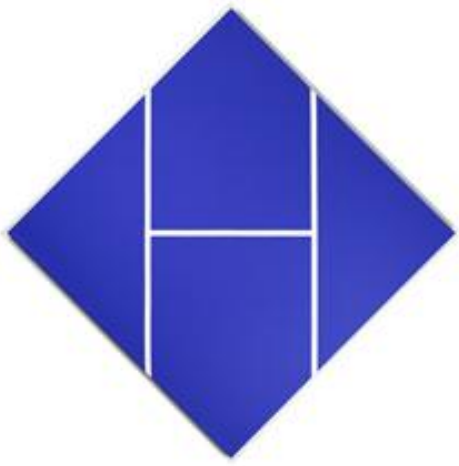
A single ZIP file containing two sub-folders, named `code` and `essays`.

- The `essays` folder should contain two PDF documents, containing your written answers to Parts 1 and 4 of the coursework. (Note that Part 4 also has a code component that is to be submitted into the `code` folder. The two files in the `essays` folder are to be named `HerreraEssay.pdf` and `Report.pdf`, as specified above.
- The `code` folder should contain three sub-folders named `BAndW`, `HerreraSimple` and `Exploration`. Each sub-folder should contain your Processing sketch for the respective part, named as specified above (i.e. `BAndW.pde`, `HerreraSimple.pde` and `Exploration.pde`) , as well as any other material that is needed to run the sketches. The `HerreraSimple` folder should also contian the output images you created when exploring colour.
- Your ZIP file should be named according to the following format: *FamilyName*`_`*SRN*`_CO1112cw1.zip` (e.g. `Smith_160123456_CO1112cw1.zip`)

Important: Be very careful to check that your ZIP file contains all of your code before you submit it. We strongly encourage you to try unzipping the file into a blank temporary directory on your own computer before your submit it, to check that it contains all of your `.pde` files, as well as any `data` files that might be necessary.

All image reproductions presented in this coursework have been taken from `wikiart.org`.

Irlanda, Herrera, 1952



Cobalt, Herrera, 1982

Tondo3Colors, Herrera, 1958

More yellow, less green, Herrera, 1989

Blue with Orange, Herrera, 1984

Encounter, Herrera, 2009

CO1112 Creative Computing 1: Assignment 2

Introduction

In this coursework we will continue our exploration of computer-generated art inspired by the Cuban artist Carmen Herrera, which we began in coursework 1. We'll be employing some of the techniques described in Volume 2 of the CO1112 Subject Guide, so be sure you have read the relevant sections of the guide before attempting each part. Specifically, Part 1 uses 3D graphics (Chapter 2 of the guide), Part 2 uses fractals (Chapter 6), and Part 3 requires knowledge of genetic algorithms (Chapter 6).

Part 1: 3D drawing and projections

Create a Processing sketch called `part1.pde` that does the following:

1. Draw two rectangles in 3D space, with one edge (two corners) shared by both rectangles — see Figure 2 below (which is a copy of Figure 2.5 from page 35 of Volume 2 of the Subject Guide) for an example of what we are looking for. Generate the positions of the corners at random, using Processing's `random()` function; you will need to generate six random 3D points in total for the two rectangles, call them `{a, b, c, d, e, f}`, where Rectangle 1 has corners `{a, b, c, d}`, and Rectangle 2 has corners `{c, d, e, f}`.
2. Using your knowledge of colour combinations obtained in coursework 1, select colours for the two rectangles, and also for the background. You should select the colours semi-randomly, i.e. not hard-coded, but guided by your knowledge of colour theory (for a quick refresh, see Section 1.5 of Volume 2 of the Subject Guide).
3. Using Processing's `save()` function, save a snapshot of the sketch's output in an image file (we suggest you use either JPEG or PNG format). Use a unique name for the image file, so that if you run the sketch multiple times, the previous image files do not get written over.

Pay attention to your coding style: your code should be neat and well-commented.

Test the sketch by running it multiple times to see whether the output is as expected. In your coursework submission, say whether or not you found any problems. If you did, say how you attempted to solve them, and whether your attempts were successful.

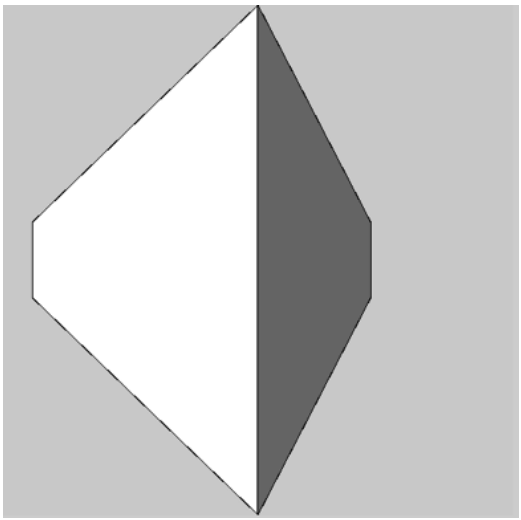


Figure 2: An example of the expected output for Part 1. This particular example is grey-scale, but your sketch should be able to generate a range of colours.

Run the finished sketch at least 25 times to generate 25 images. In your submitted report, show these images in a table on a single page (e.g. in a 5x5 grid). If you generate more than 25 images, you may use more than one page. You may find it useful to use the CO1112 course discussion forum on the VLE to exchange ideas on how best to do this in Word, Google Docs, LaTeX, or whatever package you are using to prepare your document.

Pick three of the images that you think are the best or most interesting. Show larger versions of these images in your submitted report, and for each one, discuss (in a few sentences) why you chose it.

Completing the basic instructions given above will allow you to obtain average marks for this part of the coursework. To obtain higher marks, we will be looking for extra effort and intuition. Examples of possible areas where more effort might be spent include:

- considering sensible limits for the rectangle corners
- experimenting with the camera position
- experimenting with different ways of selecting colours
- automating the process of generating 25 random images.

These are just some examples, but extra marks will also be given for any other sensible extension to the basic instructions. Any such extra effort should be adequately described and explained in your submission.

[35%]

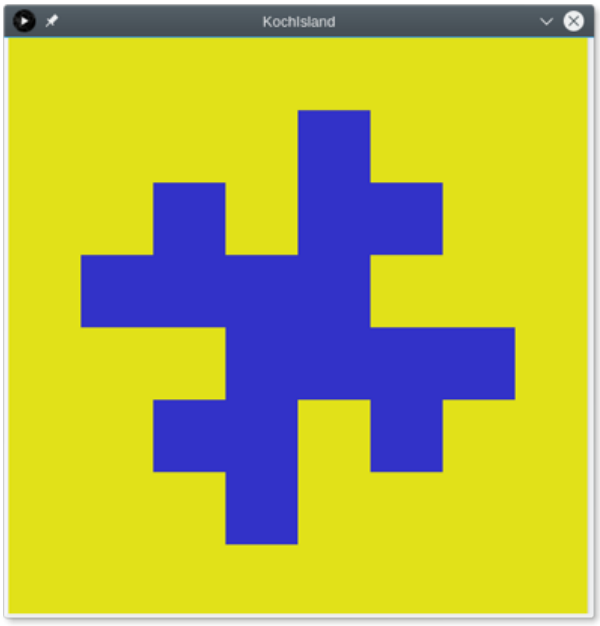


Figure 3: Default output of the sketch provided for Part 2.

Part 2: Fractals

Use the provided sketch `part2.pde` as the starting point for this part of the coursework. This sketch is based upon the quadratic Koch island sketch shown in Figure 6.3 (page 133) of Volume 2 of the subject guide. It has been modified slightly so that the fractal's outline is constructed by adding vertices to a shape created using calls to `beginShape()` and `endShape()`. This approach allows us to specify a fill colour with which to fill the fractal shape.

Run the sketch provided. You should see the output shown in Figure 3.

Make the following modifications to the sketch:

1. Modify the sketch so that it semi-randomly picks a colour scheme for the background and fill colours. You can re-use the code you wrote for this in Part 1 if you like.

2. Initialise the *ang* variable with a random floating point number between -3.0 and +3.0.

3. Initialise the `L` variable with a random integer between 0 and 3 inclusive.

4. Modify the sketch so that it saves a snapshot of the output into an image file, as in Part 1. Specify a filename for the saved image that includes the values of the `ang` and `L` variables (e.g. `myfractal-3.0-2.jpg`).

Run the modified sketch at least 25 times to generate 25 images. In your submitted report, show these images in a table on a single page, as in Part 1.

Pick three of the images that you think are the best or most interesting. Show larger versions of these images in your submitted report, and for each one, discuss (in a few sentences) why you chose it.

Completing the basic instructions given above will allow you to obtain average marks for this part of the coursework. To obtain higher marks, make the following further modifications to your sketch (note, you will need to remove the `noLoop()` line from the sketch in order to implement the following user interactions):

1. Change the code that saves an image of the output so that it only saves an image when the user presses the 'P' key.
2. Allow the user to re-centre the sketch output by right-clicking on the output with the mouse. The `(x,y)` position of the mouse when clicked should become the centre of the screen.
3. Allow the user to zoom the image in and out by pressing the 'A' and 'Z' keys on the keyboard respectively.

Completing the instructions given above will allow you to obtain good marks for this part of the coursework. For the very highest marks, also experiment with using different fractals (i.e. different initial states and substitution rules), or make other sensible extensions. Any such extra effort should be adequately described and explained in your submission.

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Part 3: Discussion

3a: Genetic algorithms

Parts 1 and 2 have both involved generating a large number of semi-random pictures and selecting those which were most aesthetically pleasing or interesting.

Briefly describe the main steps that would be required to expand the sketch developed in Part 1 into a user-guided genetic algorithm.

Discuss any problems you might foresee in attempting to do this successfully.

Your answer to this part should be approximately 500 words long.

[15%]

3b: Is it art?

Compare and contrast the approach taken to generate pictures in Parts 1 and 2 with the approach taken by Carmen Herrera in her art. Is there any essential difference in the approaches? Does it matter if a picture was generated by a human or a computer, if the end result is the same?

Your answer to this part should be approximately 500 words long.

[15%]

Submit the following by uploading to the VLE:

A single ZIP file containing 2 sub-folders, named `code` and `report`.

- The `report` folder should contain a single PDF document containing your written answers to Parts 1, 2 and 3 of the coursework. The images you generated in Parts 1 and 2 should be included in your PDF file. Do *not* submit the individual image files.
- The `code` folder should contain two sub-folders named `part1` and `part2`. Each sub-folder should contain your Processing sketch for that part, named as specified above (i.e. `part1.pde` and `part2.pde`.)
- Your ZIP file should be named according to the following format: *FamilyName*`_`*SRN*`_CO1112cw2.zip` (e.g. `Smith_160123456_CO1112cw2.zip`)

Important: Be very careful to check that your ZIP file contains all of your code before you submit it. We strongly encourage you to try unzipping the file into a blank temporary directory on your own computer before your submit it, to check that it contains all of your `.pde` files.