



Computer Science Department

## Data Structures

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### Assignment ArtCollage – 110 course points

This assignment consists of creating an abstract data type called ArtCollage, where you will create a collage of images.

Refer to our Programming [Assignments FAQ](#) for instructions on how to install VSCode, how to use the command line and how to submit your assignments.

### Programming

We provide this [ZIP FILE](#) containing ArtCollage.java. Update and submit the file on [Autolab](#).

Observe the following rules:

- DO NOT** use System.exit().
- DO NOT** add the project or package statements.
- DO NOT** change the class name.
- DO NOT** add import statements other than the Color class already in the ArtCollage.java file.
- DO NOT** change the headers of ANY of the given methods.
- DO NOT** add any new class fields.
- ONLY** display the result as specified by the example for each problem.
- You may USE** any of the libraries provided in the zip file.

*ArtCollage (110 points).* The ArtCollage class create a collage of image tiles and provides methods to transform the tiles individually. See ArtCollage.java for the description of each method.

### One-argument Constructor

```
ArtCollage art = new ArtCollage(args[0]);  
art.showCollagePicture();
```



The original image (args[0]) has 1536 rows x 1819 columns. The collage image that results from the one-argument constructor (on the left) has 400 rows by 400 columns.

### **Three-argument Constructor**

```
ArtCollage art = new ArtCollage(args[0], 200, 3);  
art.showCollagePicture();
```



The original image (args[0]) has 1536 rows x 1819 columns. The collage image that results from the three-argument constructor (on the left) has 600 rows by 600 columns.

### **MakeCollage method**

```
// Creates a collage of 3x3 tiles.  
// Each tile dimension is 200x200 pixels.  
ArtCollage art = new ArtCollage(args[0], 200, 3);  
art.makeCollage();  
art.showCollagePicture();
```

```
// Creates a default collage of 4x4 tiles.  
// Each default tile dimension is 100x100 pixels.  
ArtCollage art = new ArtCollage(args[0]);
```

```
art.makeCollage();  
art.showCollagePicture();
```



## Change Tile Methods

```
// Creates a collage of 3x3 tiles.  
// Each tile dimension is 200x200 pixels  
ArtCollage art =  
    new ArtCollage(args[0], 200, 3);  
  
art.makeCollage();  
  
// Colorize tile at col 2, row 2  
// to only show the red component  
art.colorizeTile("red",2,2);  
art.showCollagePicture();
```

```
// Creates a collage of 3x3 tiles.  
// Each tile dimension is 200x200 pixels  
ArtCollage art =  
    new ArtCollage(args[0], 200, 3);  
  
art.makeCollage();  
  
// Colorize tile at col 2, row 1  
// to only show the blue component  
art.colorizeTile("blue",2,1);  
art.showCollagePicture();
```

```
// Creates a collage of 3x3 tiles.  
// Each tile dimension is 200x200 pixels  
ArtCollage art =  
    new ArtCollage(args[0], 200, 3);  
  
art.makeCollage();  
  
// Colorize tile at col 0, row 0  
// to only show the green component  
art.colorizeTile("green",0,0);  
art.showCollagePicture();
```







```
// Creates a collage of 3x3 tiles. Each tile dimension is 200x200 pixels
ArtCollage art =
    new ArtCollage(args[0], 200, 3);

art.makeCollage();

// Converts the tile at col 1, row 0
// from color to greyscale
art.grayscaleTile(1, 0);
art.showCollagePicture();
```

```
// Creates a collage of 3x3 tiles.
// Each tile dimension is 200x200 pixels
ArtCollage art =
    new ArtCollage(args[0], 200, 3);

art.makeCollage();

// Replace tile at col 1, row 1 with
// args[1] image
art.replaceTile(args[1],1,1);
art.showCollagePicture();
```





**Note:** Make sure to test `colorizeTile()` and `greyscaleTile()` using a collage where each tile has a different image.



```
ArtCollage art = new ArtCollage(args[0], 200, 2);
art.makeCollage();

// Replace 3 tiles
art.replaceTile(args[1],0,1);
art.replaceTile(args[2],1,0);
art.replaceTile(args[3],1,1);
art.colorizeTile("green",0,0);
art.showCollagePicture();
```

## Before submission

2. *Collaboration policy.* Read our collaboration policy [here](#).
3. *Update @author.* Update the @author tag of the files with your name, email and netid.
4. *Submitting the assignment.* Submit *ArtCollage.java* via the web submission system called Autolab. To do this, click the *Assignments* link from the course website; click the *Submit* link for that assignment.

## Getting help

If anything is unclear, don't hesitate to drop by office hours or post a question on Piazza. Find instructors office hours by clicking the [Staff](#) link from the course website.

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