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Question 3

Calculating the circularity for each object in the images: cell1.bmp, cell2.bmp

```
clc, clear all;
```

cell1.bmp

```
image = imread('cell1.bmp');
[seg_im, vals] = segmentation(image);
for val=vals(1 : end-1)
    c = circularity(seg_im, val);
    fprintf('For object of value %3g the circularity is %.3g\n', val,
    c)
end
```

```
For object of value 1 the circularity is 0.327
For object of value 11 the circularity is 0.465
For object of value 21 the circularity is 0.297
For object of value 31 the circularity is 0.242
For object of value 41 the circularity is 0.465
For object of value 51 the circularity is 0.465
For object of value 61 the circularity is 0.465
For object of value 71 the circularity is 0.272
For object of value 81 the circularity is 0.272
For object of value 91 the circularity is 0.465
For object of value 101 the circularity is 0.297
For object of value 111 the circularity is 0.465
For object of value 121 the circularity is 0.465
For object of value 131 the circularity is 0.465
For object of value 141 the circularity is 0.272
```

cell2.bmp

```
image = imread('cell2.bmp');
[seg_im, vals] = segmentation(image);
for val=vals(1 : end-1)
    c = circularity(seg_im, val);
    fprintf('For object of value %3g the circularity is %.3g\n', val,
    c)
end
```

```
For object of value 1 the circularity is 0.641
For object of value 11 the circularity is 0.682
For object of value 21 the circularity is 0.684
For object of value 31 the circularity is 0.679
For object of value 41 the circularity is 0.675
For object of value 51 the circularity is 0.682
For object of value 61 the circularity is 0.641
For object of value 71 the circularity is 0.684
For object of value 81 the circularity is 0.716
For object of value 91 the circularity is 0.675
For object of value 101 the circularity is 0.682
For object of value 111 the circularity is 0.638
For object of value 121 the circularity is 0.679
```

Calculating Circularity Function:

```
function [ c ] = circularity( image, val )
% circularity Calculates circularity for segmented shape.
% c = circularity calculation.
% image = segmented image.
% val = segmented shape value.

area = length(find(image == val));
perim = myPerim(image, val);
c = (4*pi*area)/perim^2;
end
```

Laplace perimeter Calculation Function

```
function [ perim ] = myPerim( image, val )
perim = 0;
[nrows, ncols] = size(image);
for x = 1:ncols
    for y = 1:nrows
        if image(y, x) == val
            k = 0;
            for i = -1:1
                for j = -1:1
                    if x+i < 1 || y+j < 1
                        continue
                    end
                    if image(y+j, x+i) == 255
                        k = k + 1;
                        break;
                    end
                end
            end
            if k ~= 0
                break
            end
        end
    end
    if k ~= 0
        perim = perim + 1;
        k = 0;
    end
end
```

```
end
end
end
end
end
```

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