15-112, Spring 2014

Assignment 1

Submission

You must submit one ZIP file on Autolab. This ZIP file must be named *userid*-hw1.zip and must include all of the Python files that you have written for this assignment. Please write your name and userid as a comment at the beginning of each Python file.

Recommendations

- **Make sure to test your program**.
- Make sure that your program is executable. If you are unable to complete portions of the assignment, comment out the part of the code that does not work properly, and explain what you did, what worked, and what did not. It is your responsibility to explain as carefully as you can why you think you were unable to get the code working, what you think is wrong, and how you might go about fixing it. The quality of such an explanation will be important to us in deciding whether to give you partial credit.

Tip 1: more about the instruction `circle`

As described in the documentation online, it is possible to draw a partial circle, also called *an arc*. To do so, the instruction `circle(radius,extent)` takes two arguments:

- `radius` (in pixel) determines the size of the circle
- `extent` (in degree) determines which part of the circle is drawn

Moreover, the arc will be drawn in counterclockwise direction if the radius is positive, otherwise in clockwise direction.

To get familiar with this instruction, try this snippet of code:

```
circle(100,45)
circle(-100,45)
```

Tip 2: the instruction `home`

When drawing, it is possible to make the turtle retursn to its initial position. To do so, the instruction `home()` makes the turtle returns to the origin and set its heading to its start-orientation.

To get familiar with this instruction, try this snippet of code:

```
forward(100)
left(90)
forward(100)
home()
```

Tip 3: calculating triangles

If you want to calculate angles and dimensions in triangles, this webpage might be useful:

`http://ostermiller.org/calc/triangle.html`

Tip 4: speeding up the drawing

If you want turtle to draw faster, surround your program with these two lines:

```
speed(0)
# your program goes here
done()
```

1 The Doha Skyline [60 Points]

In this exercise we want to draw the Doha Skyline as shown in figure 1.

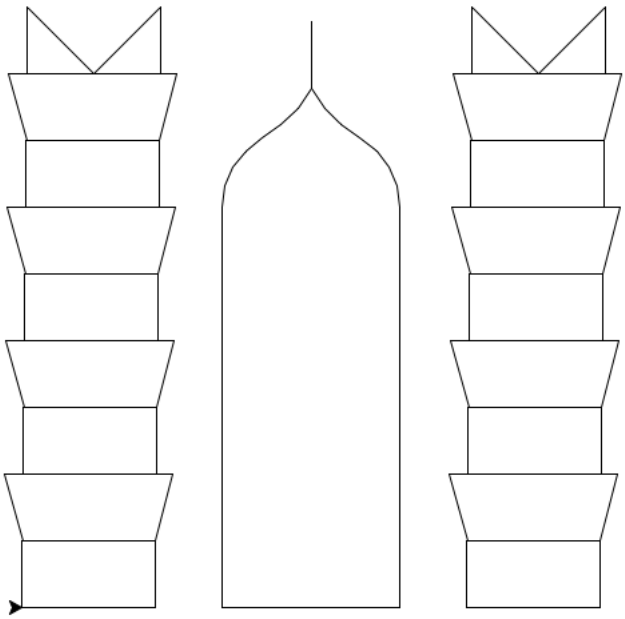

Figure 1: The Doha Skyline

1.1 Drawing the Palm Twin Towers [20 points]

Write a function called `palm` that draws one palm tower. Your function should make use of a loop.

1.2 Drawing the Burj Qatar [20 points]

Write a function called `burj` that draws the Burj Qatar tower in the center. Notice that the top is curved.

1.3 Putting it all together to draw the Doha Skyline [10 points]

Write a program that combines the functions `palm` and `burj` to draw the complete Doha Skyline.

1.4 Adding your personal touch [10 points]

Extend your drawing by adding 2 new features of your choice. To make sure that what you have added is significant, show your picture to a friend, he or she should be able to point out the new features.

2 The pattern [40 points]

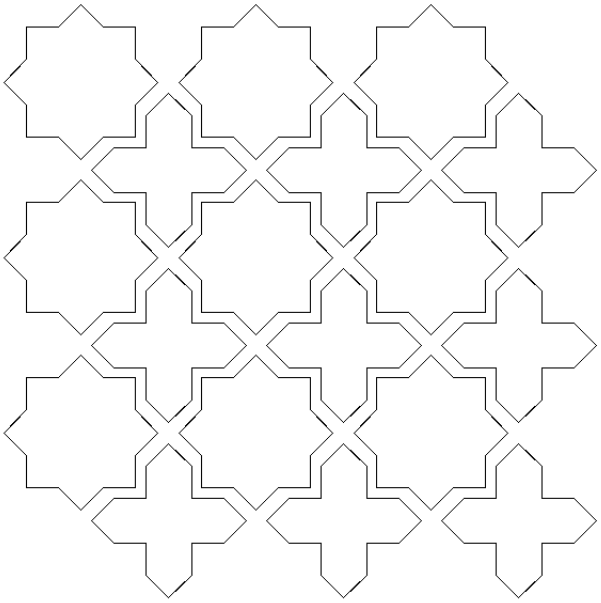

Figure 2: The pattern

2.1 Finding and drawing the tile [20 points]

From the pattern shown in figure 2, find the minimum *tile* that is repeated in the pattern and write a function that draws this tile.

2.2 Drawing the pattern [20 points]

Write a program that draws the pattern as shown in figure 2.

