COP-4338 System Programming

Programming Assignment 4:

FIU KF School of Computing & Info. Sciences

In this assignment, you are asked to write a program that stores and manipulates a list of (at-most 1000) polygons. Each polygon must be stored in a structure like this:

```
typedef struct {
    int numberOfVertices;
    Direction shiftDirection;
    Vertex* vertexList;
}Polygon;
```

where Direction and Vertex are defined like this:

```
typedef enum {
    NONE = 0,
    UP = 1,
    DOWN = 2,
    LEFT = 4,
    RIGHT = 8
}Direction;
typedef struct {
    int x, y;
}Vertex;
```

1 Program Input Commands

There are five valid input commands:

- add $x_1y_1x_2y_2 \ldots x_ny_n$: adds an n-gon with vertices located at coordinates (x_1, y_1), (x_2, y_2), ..., (x_n, y_n) to the list of all polygons. The newly added polygon must have its shiftDirection set to NONE.

- summary: prints the program's list of polygons. For each polygon, you need to print the number of vertices and the x-y coordinates of the polygon's centroid. To avoid the complications of calculating the centroid, you can assume that the x-coordinate (y-coordinate) of a polygon's centroid is equal to the average of x-coordinates (y-coordinates) of the polgyon's vertices.

- turn k x: updates the shiftDirection of polygon stored at index k of the program's list of polygons. The shiftDirection has to be updated based on the value of x that can be equal to one of the following strings:
  - left
  - right
  - up
  - down
  - right-up or up-right
  - left-up or up-left
  - right-down or down-right
  - left-down or down-left
- shift k s: updates the x-y coordinates of vertices of polygon stored at index k of the program's list of polygons. To update the vertices' coordinates of a polygon, you need to check its shiftDirection. If the direction is NONE, then the shift command has no side effect. If the direction is RIGHT(LEFT), then s has to be added to(subtracted from) the x-coordinate of every vertex of the polygon. If the direction is UP(DOWN), then s has to be added to(subtracted from) the y-coordinate of every vertex of the polygon. If the direction is RIGHT and UP, then s has to be added to both the x-coordinate and y-coordinate of every vertex of the polygon, etc.
- quit: ends the program

2 Submissions

You need to submit a *.zip* file compressing the following files:

- the C source file(s) related to the assignment (*.c* files).
- the header files (.h files)
- **A readme file clearly explaining what parts have/haven't been implemented.**