Hw4 Program Manual

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1 Introduction

This is a brief manual on how to run the program for homework 4.

2 Building the program

In order to build the program, type **make** in the directory containing the Makefile. The output should be an executable called **out**.

3 How to use the program

3.1 Command line parameters

In order to run the program, you need to add 2 extra parameters to the command line which are the main window's width and the window's height.

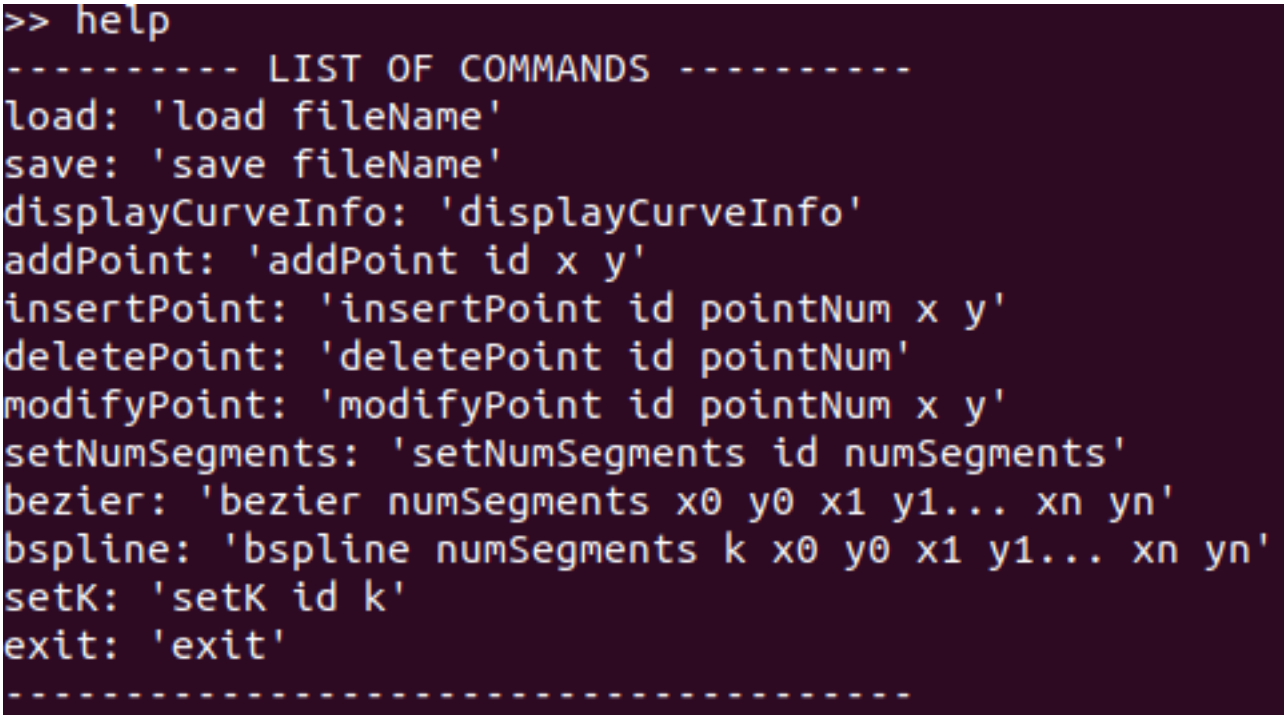
```
// syntax for running the program
./out windowWidth windowHeight

// Example run of the program.
// This runs the program with a window width of 1000 and height 1000
./out 1000 1000
```

3.2 Important Notes

In this program, the world is bounded by a fixed bounding box with xmin = -500, xmax = 500, ymin = -500, and ymax = 500.

3.3 Commands

Note: All commands in this program uses a single space in order to separate the arguments. In order to see a list of all of the possible commands that you can enter, type **help** into the command prompt. Output of the **help** command can be seen below.



3.4 Loading and saving scenes

3.4.1 Loading scenes

In order to load a scene, simply enter the command: "load fileName" where **fileName** is the path to the file that you want to load

```
// syntax for running the command
load fileName

// Example of loading the sample file
load input/test.txt
```

3.4.2 Saving scenes

In order to save a scene, simply enter the command: "save fileName" where **fileName** is the path to the file that you want to save

```
// syntax for running the command
save fileName

// Example of saving the scene to a file
save input/sample.txt
```

3.4.3 Displaying Curve Information in the Scene

In order to print out information about all of the curves in the scene, simply type in **displayCurveInfo** into the prompt.

3.4.4 Adding points to a curve

In order to add points to the end of a curve, you need to specify the **id** and **x** and **y** coordinates of the new point that you want to add.

```
// syntax for running the command
addPoint id x y

// Adds the point (100, 100) at the end of the point list in the curve that has an id of 2
addPoint 2 100 100
```

3.4.5 Inserting points to a curve

In order to insert points to a curve, you need to specify the **id**, **pointNum** which is the place that you want to insert the point into inside the point list in the curve, and **x** and **y** coordinates of the new point that you want to add.

```
// syntax for running the command
insertPoint id pointNum x y

// Inserts the point (50, 50) in the 0th spot of the list of points in the curve that has an id of
    3
insertPoint 3 0 100 100
```

3.4.6 Deleting a point from a curve

In order to delete a point from a curve, you need to specify the **id** and the **pointNum** or the position in the point list that corresponds to the point that you want to delete.

```
// syntax for running the command
deletePoint id pointNum

// Deletes the point in the 4th spot of the point list in the curve with id of 1
deletePoint 1 4
```

3.4.7 Modifying points in a curve

In order to modify points in a curve, you need to specify the **id**, **pointNum** which is the place that you want to modify the point inside the point list in the curve, and **x** and **y** coordinates of the new point that you want to modify the old coordinates with.

```
// syntax for running the command
modifyPoint id pointNum x y

// Modifies the curve with id of 0 and modifies the point in position 2 of the point list and
    replaces the point with a point with coordinates (20, -100)
modifyPoint 0 2 20 -100
```

3.4.8 Setting the number of segments of a curve

In order to set the number of segments (or resolution) of a curve, you need to specify the curve's **id** and the number of segments that you want the curve to have

```
// syntax for running the command
setNumSegments id numSegments
```

```
// sets the number of segments of the curve with id of 0 to 20
setNumSegments 0 20
```

3.4.9 Setting the Order (K) of a Bspline curve

In order to set order (k) of Bspline curves, you will need to specify the **id** of the curve and the new order or k-value that you want the bspline curve to have.

```
// syntax for running the command
setK id k

// sets the order of the bspline curve with id of 1 to 4
setK 1 4
```

3.4.10 Drawing new Bezier curves

In order to draw brand new Bezier curves, you will need to specify the number of segments of the curve and the list of all of the control points

```
// syntax for running the command
bezier numSegments x0 y0 x1 y1... xn yn

// Creates a bezier curve with 20 segments and the coordinates (0, 0), (10, 10), (30, 30)
bezier 20 0 0 10 10 30 30
```

3.4.11 Drawing new Bspline curves

In order to draw brand new Bspline curves, you will need to specify the number of segments of the curve, the order k, and the list of all of the control points.

```
// syntax for running the command
bspline numSegments k x0 y0 x1 y1... xn yn

// Creates a bspline curve with 10 segments and the coordinates (0, 0), (10, 10), (30, 30), (40,
    40)
bspline 10 3 0 0 10 10 30 30 40 40
```

3.5 Exiting the program

In order to exit the program, simply type the command: 'exit'

```
// syntax for running the command
exit
```

3.6 File Format

The files to load from and save to should be in the following format as seen in the example below.

```
2       // number of curves in the scene
        // definition of 1st curve:
0       // 0 if it's a bezier curve and 1 if it's a bspline curve
```

```
10      // number of segments of the curve
3       // number of control points
0.0 0.0 // coordinates of 1st point
0.0 0.0 // coordinates of 2nd point
1.0 0.0 // coordinates of 3rd point

1       // 0 if it's a bezier curve and 1 if it's a bspline curve
10      // number of segments of the curve
3       // order k (this line is onlf for bspline curves)
3       // number of control points
0.0 0.0 // coordinates of 1st point
0.0 0.0 // coordinates of 2nd point
1.0 0.0 // coordinates of 3rd point
```

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4 Algorithm Implementation locations

4.1 Bezier, de Casteljau

File: bezier.cpp
Lines: 33-84
Lines: 22-29

4.2 Bspline, de Boor

File: bspline.cpp
Lines: 50-104
Lines: 25-45