COL 216 ASSIGNMENT-1

SOURAV 2019CS10404

HARIKESH 2019CS10355

APPROACH FOR CODE

- FIRSTLY, WE ARE TAKING INPUT FROM OUR SYSTEM AND AFTER THAT ON EXECUTING WE HAVE TO PROVIDE THE NUMBER OF POINTS.
- WE HAVE TO MAKE SURE THAT FOR NUMBER OF POINTS TO BE 0 OR 1 THE AREA BOUNDED IS 0.
- AFTER THAT WE ARE TAKING X AND Y COORDINATES RESPECTIVELY UNTIL WE GET THE PAIR FOR ALL POINTS AS PROVIDED EARLIER.
- NOW, WE JUST HAVE TO USE SOME MATHEMATICS FOR FINDING THE AREA (I.E. WE CAN DIVIDE INPUT IN 2 SUCCESSIVE COORDINATES AND THEN FIND AREA BOUNDED BY THOSE POINTS AND X AXIS USING THE GENERAL FORMULAE (AREA = ½*(SUM OF PARALLEL SIDES (I.E. Y1+Y2))*(DISTANCE BETWEEN THEM(I.E.X2-X1))).
- THEN WE JUST CONSIDER SOME CASES IN THEM THOSE ARE AS FOLLOW:
- CASE 1: WHEN ALL XI, X(I+1), YI, Y(I+1) ARE POSITIVE THEN WE SIMPLY APPLY THE FORMULAE THAT IS GIVEN ABOVE AND IT SUMMED UP GIVES US THE AREA BOUNDED BY THOSE 2 POINTS.
- CASE 2: WHEN ALL XI,X(I+1),YI,Y(I+1) ARE NEGATIVE THEN ALSO WE APPLY THE SAME FORMULAE BUT THIS TIME WE TAKE MODULUS OF THE (Y1+Y2) AND (X2-X1) AS IT IS OUR DESIGN APPROACH BECAUSE AREA BOUNDED IS ALWAYS POSITIVE.
- CASE 3: WHEN ONE OF YI ,Y(I+1) IS +VE AND ANOTHER IS –VE AND SAME FOR XI,X(I+1) THEN WE APPLY THE FORMULAE I.E. (AREA = ½*((Y1*Y1)*(|X1-X2|)/(|Y2-Y1|)+ (Y2*Y2)*(|X1-X2|)/(|Y2-Y1|))).
- THIS CAN BE EASILY DERIVED FROM THE CONCEPT OF SIMILAR TRIANGLES.
- THEN WE ARE GOING TO UPDATE OUR FLOAT VARIABLE THAT WE HAVE INITIATED TO 0 AND ADD OUR AREA TO IT.

- After that we take next pair of points and follow similar procedure till we have calculated area of all pair of consecutive points.

Assumptions made in our design

- Used temporary registers to store the intermediate values in the precision of 32-bits.
- Instead of printing the overflow case we have just ignored it.
- Used the number of points only greater than or equal to zero and also the inputs are given only in order of increasing x-coordinates.

Test case strategy

- As we have described different types of test cases above so they include if two consecutive points are in same quadrant or are in different quadrants.
- In later case, the area bounded may be below x axis but that is taken as positive in our design choice.
- Checked some ambiguous cases like when only one point is given or 0 points are given and all points lie in the same vertical line (which is when two or more points have same x coordinate).
- Even checked the case when there is a single point which is repeating many times in between the input.
- In the case when two points have same x-coordinates we have checked it by taking no restriction on y coordinates that is they may or may not be in increasing order.
- Checked the value of each and every register after running the code and confirm it by manual calculations and printing while testing.