SNS COLLEGE OF ENGINEERING Coimbatore-107



COURSE NAME: ANALYSIS OF ALGORITHM

II YEAR/ IV SEMESTER

UNIT – II

BRUTE FORCE METHOD

Topic

Convex-Hull Problems





| | Unit II. convex Hull problem page |
|--|--|
| | the convex Hall of set of points |
| Talk and a second | is the smallest convex shape that encloses all the points. |
| A STATE OF THE STA | that encloses all the points. |
| and the same of th | Theces every pair of |
| AND THE REAL PROPERTY. | points to see it forms. |
| Carelon Carelo | edge of convex Hull. |
| The state of the s | *. It is also called Janvis |
| District Control of the Control of t | march (or) Grigt Wrapping Algorithm. |
| | Example: |
| · | Note: All edge must have all other |
| | points on one side (All above 67) All Below the line). |
| | =) Il a pair satisfies the |
| | Condition, it is part of |
| | Convex Hull. |
| HEET N | Convex Hull. Example: Step: |
| | Use deferminant formula. |
| | for 3 points p(x, y,), p2(x2, y2) |
| | and p(x3, y3) compute; |
| | Value = (x2-x,).(y3-y,) - (y2-y,).(x3-x,) |
| | Ivalue = (x 2-21/1931/12 92 2 |
| | poents forming the line. |
| | 23.43 > pants we cheek. |
| | 73105 |

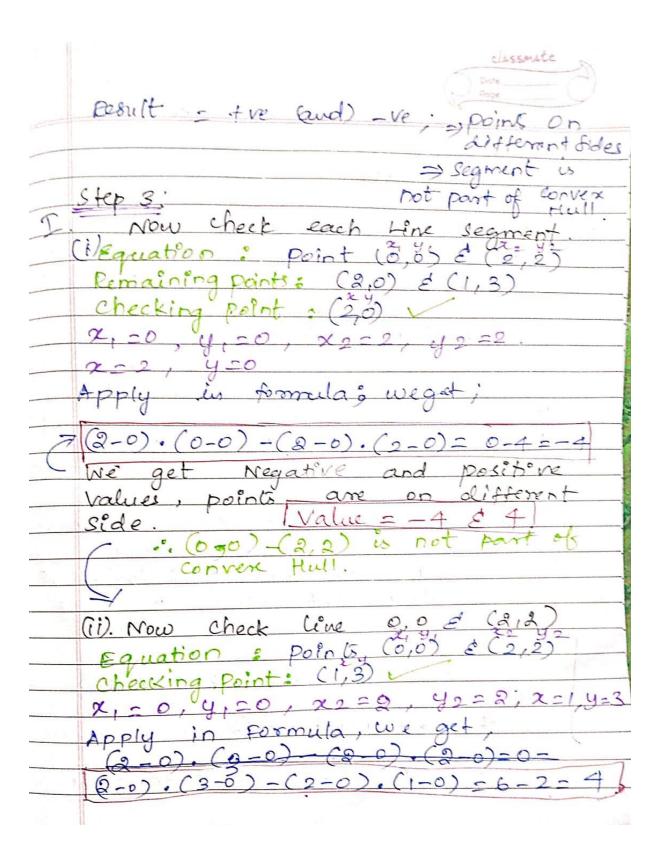




| | >0 P3 4 on one side 6 |
|--------------|--|
| | 92 value > 0, P3 is on one side o |
| | as is no other |
| | 12 value 20, p3 is on other si |
| | 1 P3 Us on the line |
| | If value = 0; P3 is on the Cine |
| | Example: (20) (1,3) |
| | (0,0), $(2,2)$, $(2,0)$, $(1,3)$ |
| | |
| | Step13 Consider all line Segments |
| - | Consider |
| | between two points. |
| | 1. (0,0) -> (2,2) |
| | $2.(0,0) \to (2,0)$ |
| | $3.(0,0) \rightarrow (1,3)$ |
| | S(0,0) |
| $-\parallel$ | $A.(2,2) \longrightarrow (2,0)$ |
| | $5.(2,2) \rightarrow (1,3)$ |
| | $6.(2,0) \rightarrow (1,3)$ |
| | Now check whether all pther point |
| - | are on the Same side, for each |
| | 1,000 |
| $-\parallel$ | l'ène segment. |
| | |
| 110 | step 2 ° |
| 115 | Use cross peoduet fromula |
| - | Use cross pedale fromula |
| AC. | 22-2,). (y-y,)-(y2-y,). (2-2,) |
| | |
| | Result = +ve(08) -ve; all are on same side & Segment belong to honvex hall |
| 1 | Same Elde & |
| - | Segment beloff |
| | to honverhall |
| | |
| | |







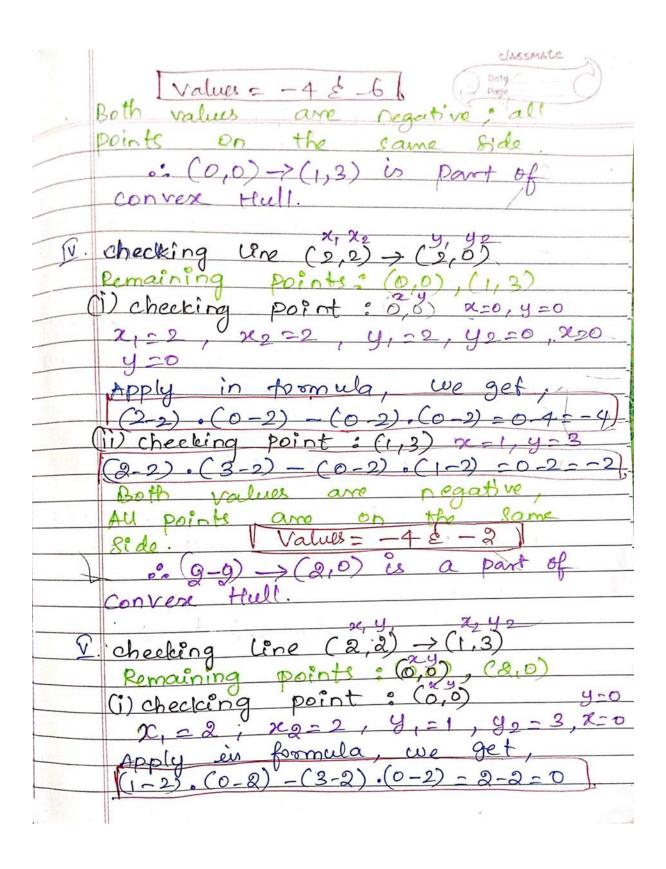




| Prince | Page 14 |
|-----------|--|
| 竹. | Now cheeking line Segment (0,0) x (2,2), (1,3) Remaining points: (2,2), (1,3) i): checking point & (2,2); (1,3) x, =0, y, =0, x=2, y, =0, x=2, y Apply in formula, we get Apply in formula, we get |
| | i) checking point & (2/2) |
| | 20,50,450, 22=2 / get |
| | Apply in Transition of the poly |
| | $(2-0) \cdot (2-0) - (0-0) \cdot (2-0) \cdot (2-0$ |
| | (ii) cheeking point: (1,3) 2,50,4,50,2,52,42=0,251,4: |
| | Apply in formula, we get |
| | Apply in formula, we get $(2-0) \cdot (3-0) - (0-0) \cdot (1-0) = 6-0 = 6$ |
| | Both Values are positive; all poin |
| | are on same stde (0-0) - (20) is part of converse. |
| | |
| Remaining | Cheeking line Segment : (0,0) > (1, i) Checking point :(2,2) x=2,y=2 Apply in fromula, we-get |
| Point. | The state of the s |
| CAPINI) | $(1-0) \cdot (2-0) - (3-0) \cdot (2-0) = 2-6 = -6$ |
| | fi) cheeloing point : (2,0) 2 2,42 |
| 1 1- | $(1-0) \cdot (0-0) - (3-0) \cdot (2-0) = 0-6=$ |
| Redon 11 | |

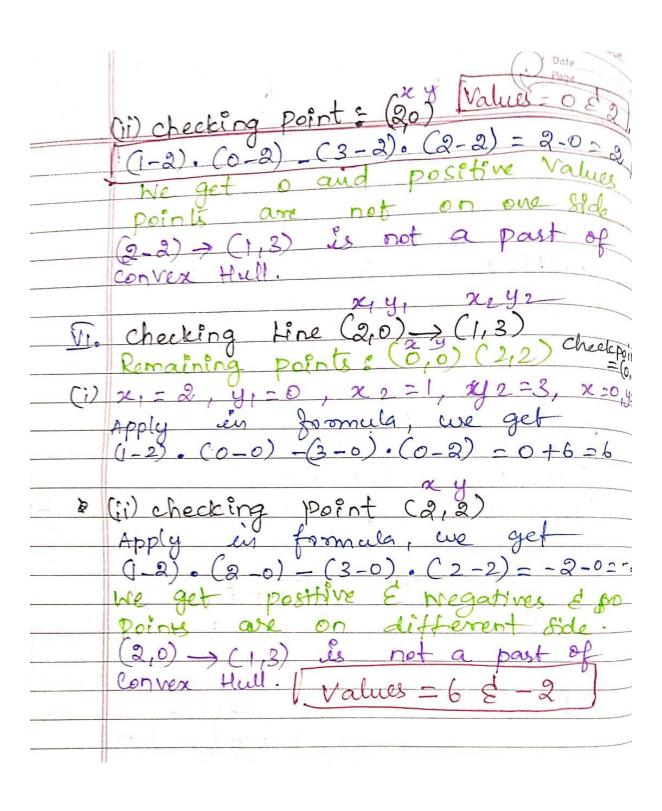
















| - 41 | | | C WWW Mage | LAN |
|-------|--|---|--------------|--------------|
| | Line Segment $(0,0) \rightarrow (2,2)$ | otherpoints | crosspead. | Conventuly |
| 1, | $(0,0) \rightarrow (2,2)$ | (2,0), (1,3) | mixed (t and | NO |
| | | | () | |
| 2. | $(0,0) \rightarrow (2,0)$ | (a, 2), (1,3) | Same (+) | yes |
| | | 1 1 | ard +) 5 | |
| 3. | $(0,0) \rightarrow (1,3)$ | (2,2),(2,0) | Same (- ? | yes |
| | | | and -) } | |
| | $(2,2) \rightarrow (2,0)$ | (0,0),(1,3) | Same (-? | yes |
| | () | C \ C \ | and -)) | |
| 5. | $(2,2) \rightarrow (1,3)$ | (0,0), (2,0) | mixed (+ { | NO |
| | (90).(.2) | (0.0) (0.1) | and -) | No |
| | $(2,0) \rightarrow (1,3)$ | (0,0), (2,2) | mixed (+ 5 | 000 |
| 1 4 | The points | for moine | convex | Hull |
| | 1ne poins | 1) \$ 811111 | > pole | igons. |
| X 1 + | (0,0) | 2.0) (2.2) | (13) 11 | 10 |
| | Margarthan | | | |
| | Algorithm | converse Hull (| points [[2] | <u>n</u>) |
| | 5 | | | |
| | for (i= 0 ; | ixn; 1++) | | |
| | 5 | . 11 | | |
| | for (j=i+li | jan; j+t) | 1 12 125 1 | |
| | 5 | 10 A 10 10 10 10 10 10 10 10 10 10 10 10 10 | A. | |
| | for (kz | ikani kt | +) | |
| | <u></u> | 0 11 . | • > | |
| 100 | iz (K= | = 1 K== | J) | |
| | | | | and the same |





| | Cp = Crisspeed (points [i][o], points [i][i], Points [i][o], points [i][i], Points [i][i] Points [K][i]); |
|-----------------------|---|
| | 12 (cp > 0) post+; else (cp < 0) neg++; |
| | 11 if (pos == 0) 11 heg = = 0) 1 Add edge; |
| | 3 3 |
| | Algorithm crosspeod (x1, y1, x2, y2, x, y) |
| | return (22-21) * (y-y1) - (y2-y1) * (2-2) |
| | Time Complexity: $o(n^2)$ pairs & $o(n^3) \rightarrow checking Co(n^2)$ pairs & Venifying $(o(n))$ points for Each pair |
| | Space complexitys |
| And the second second | Variables. |