NagpurStudents

www.nagpurstudents.org

B.E. (Computer Science & Engineering) Seventh Semester (C.B.S.)

Elective - II : Computational Geometry

P. Pages : 2 **NRJ/KW/17/4632**

Time : Three Hours * 0 9 4 0 * Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Assume suitable data whenever necessary.

1. What is triangulation? Describe the following : **13**

i) Angular Triangulation

ii) Point - set Triangulation

OR

2. Differentiate between **13**

i) Classical and computational geometry.

ii) Plane and 3D line.

iii) Convex and concave in context of computational geometry.

3. a) Discuss linear programming with prune and search in detail. **7**

b) What is geometric searching? Discuss point location and fractional cascading in detail. **7**

OR

4. a) What is Kd - trees? Explain with example. **7**

b) What is orthogonal range searching? How it is different than linear searching. **7**

5. What do you understand by divide and conquer? Discuss flip and incremental algorithm in detail. **13**

OR

6. a) Describe voronoi diagram. What do you understand by duality of voronoi diagrams? **7**

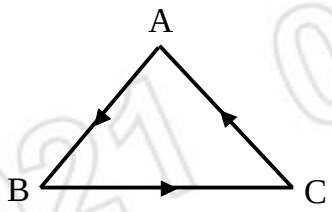
b) Describe min - max angle properties in detail. **6**

7. a) Explain Delaunay triangulations of a planar point set. **7**

b) Explain the data structure for priority search trees used in geometric functions. **6**

OR

8. a) Consider a triangle ABC describe by vector $\vec{AB}$, $\vec{BC}$ and $\vec{AC}$. Explain how to derive equation of a plane containing this triangle with the information supplied. If the above information is not sufficient, what more information would be required. **6**



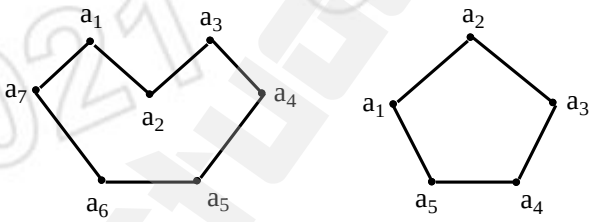
b) For triangle in part as develop an algorithm to indicate if a point P is internal or external. For an external point the algorithm must be able to tell the side with respect to plane containing triangle. **7**

9. a) What is convex hull? Discuss the orientation and limitation of convex hull in detail. **7**

b) Write short note on construction of convex hull in 2 - D. **7**

OR

10. a) Define convex hull. Determine convex hull, if any, for the following figures justify your solution. **7**



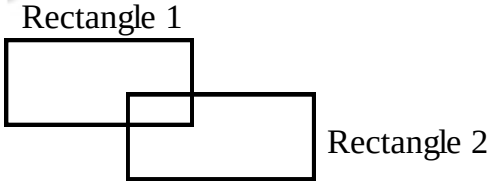
b) Discuss any two application of convex hull. **7**

11. a) Explain the structure of quadtree? What the application of quadtrees. **7**

b) What is partition tree? How it is need in range searching. **6**

OR

12. Define union and intersection of a set of rectangles. Determine mathematically perimeter of union and intersection of two rectangles. Assume that these rectangles lie in same plane and are not making on angle. **13**



****

NagpurStudents

www.nagpurstudents.org

High expectations are the key to everything.

~ Sam Walton