Pop Quiz (Week 9) [20 mins] – 20 pts

Name:_____Student ID: _____

Please show your work for partial credits.

1. **[2+2+3=9]** Consider two rectangles, A and B. A is a square with center at (5,5) and each side of length 2. B is a rectangle whose center is (8,8) with sides of length 6 (in Y direction) and 8 (in X direction) respectively.
    a. What is the center and radius of a circular bounding geometry of A?
    Center = (5,5)
    Radius = √2

    b. What is the center and radius of a circular bounding geometry of B?
    Center = (8,8)
    Radius = 5

    c. Are the bounding geometries for A and B colliding? Justify your answer briefly.
    Yes.
    Addition of radius is 5+√2. Distance between the centers is 3√2. Since the addition of radius is bigger than the distance between the centers, they are colliding.

2. **[2+1 = 3]** Consider an image of spatial resolution 600x400 and color resolution of 4. We would like to increase the color resolution to 28 using dithering over nxn blocks of pixels.
    a. The value of n is
        i. 2
        ii. 3
        iii. 4
    b. We would reduce the spatial resolution by a factor of
        i. 2
        ii. 4
        iii. 3
        iv. 9
        v. 4
        vi. 16
3. **[2]** Consider a gamma function where output O is related to the input I by $O = I^{\gamma}$. The most likely value of γ for a camera will be

a. 2.0
b. 1.0
c. 0.5

4. **[2]** The normal map for a bump map will always be
   a. Blueish
   b. Reddish
   c. Greenish
5. **[2]** The environment map is
   a. View dependent
   b. View independent
6. **[2]** Consider a hierarchical object representation of the leg. Which of the following tree will be its most likely representation?
   a. Ankle → Knee → Hip
   b. Hip → Knee → Ankle
   c. Knee → Ankle → Hip