Chapter 11 solutions

1. In DCS, the maximum color timeslot variable (maxcolor) is fixed and does not change throughout the functioning of the algorithm. Colorwave is based on DCS and in Colorwave the maximum number of color available at a reader is changes dynamically. AC-MRFID is designed for mobile RFID. Colorwave is not suitable for mobile RFID reader environment, because in mobile RFID readers keep moving and reader collisions can occur frequently and the value of maxcolor becomes unnecessarily high, especially in the case where the readers gather together densely in a small area. AC-MRFID adjusts the maximum timeslots allocated to a reader in a frame by setting its value according to the number of readers located in the read range of the reader.

2. From Equation (11.1) we know that

[DISP]

$$\max\_timeslots = \alpha + \left\lfloor \alpha \times \frac{r_i^2 - r_r^2}{r_r^2} \right\rfloor + 1$$

[DISPX]

[FT]Given that:

[DISP]

Interference range (r_i) = 3 meter

Read range (r_r) = 2 meter

[DISPX]

[FT]For reader R_1, the number of readers which are in read range of reader R_1 (α) = 2.

[DISP]

$$\text{Maximum timeslots} = 2 + \left\lfloor 2 \times \frac{(\quad^2 - 2^2}{2^2} \right\rfloor + 1$$

Maximum timeslots = 5

[DISPX]

[FT]For reader R_7, the number of readers which are in read range of reader R_1 (α) = 4.

[DISP]

$$\text{Maximum timeslots} = 4 + \left\lfloor 4 \times \frac{(\quad^2 - 2^2}{2^2} \right\rfloor + 1$$

Maximum timeslots = 10

[DISPX]

[FT]For reader R_{10}, the number of readers which are in read range of reader R_1 (α) = 3.

[DISP]

$$\text{Maximum timeslots} = 3 + \left\lfloor 3 \times \frac{(\quad^2 - 2^2}{2^2} \right\rfloor + 1$$

Maximum timeslots = 8[DISPX]