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17EC72

Seventh Semester B.E. Degree Examination, July/August 2021
Digital Image Processing

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions.***

1 a. Draw the block diagram of General Purpose image processing system and explain it. **(08 Marks)**

b. Explain the process of image sampling and quantization. **(08 Marks)**

c. Let p and q are pixels at co-ordinates (10, 12) and (15, 20) respectively. Find the which distance measure gives minimum distance between them. **(04 Marks)**

2 a. Discuss the relationship between pixels in details. **(08 Marks)**

b. Consider the image segment,

	3	1	2	① q
	2	2	0	2
	1	2	1	1
p	①	0	1	1

Let V = [0, 1], compute the length of 4, 8 and M path between p and q. If a particular path does not exist between p and q explain why? **(08 Marks)**

c. Mention the applications of image. **(04 Marks)**

3 a. Explain the following intensity transformation functions:
(i) Image negatives.
(ii) Log transformation.
(iii) Power law transformation. **(12 Marks)**

b. Explain Bit plane slicing with example. **(08 Marks)**

4 a. With the block diagram, and mathematical equations, explain Homomorphic filtering. **(10 Marks)**

b. Explain the Butterworth LPF and Gaussian LPF for image smoothing. **(10 Marks)**

5 a. Discuss the most commonly used noise probability density functions in image processing applications. **(10 Marks)**

b. Explain the following techniques used for noise removal in image processing:
(i) Arithmetic mean filter. (ii) Median filter **(10 Marks)**

6 a. Explain the followings for periodic noise reduction:
(i) Band rejection filters.
(ii) Band pass filters. **(10 Marks)**

b. Discuss the three principal way to estimate the degradation function for use in image restoration. **(10 Marks)**

7 a. Discuss the following color models:
(i) RGB color model.
(ii) CMY model.
(iii) HSI model **(15 Marks)**

b. Given RGB = (0.683, 0.1608, 0.1922) convert this to HSI model. **(05 Marks)**

8 a. Draw the block diagram of pseudo color processing and explain it. **(08 Marks)**
b. Explain two dimensional four band filter band for subband image coding. **(08 Marks)**
c. What is duality of a morphological image processing? **(04 Marks)**

9 a. Explain the following of image segmentation:
(i) Line detection
(ii) Edge detection. **(12 Marks)**
b. Explain region Splitting and Merging. **(08 Marks)**

10 a. Explain the chain codes used to represent a boundary. **(08 Marks)**
b. Write the Otsu's algorithm used for optimum global thresholding. **(08 Marks)**
c. What is skeletons? **(04 Marks)**

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17EC743

Seventh Semester B.E. Degree Examination, July/August 2021
Real Time Systems

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions.

1 a. Define the term "Time Constraint". How are Real Time System classified based on Time Constraint? Explain them with appropriate equations. **(10 Marks)**

b. Explain the computer control system with a suitable example. **(10 Marks)**

2 a. What is DDC? Explain DDC with block diagram? What are the advantages of DDC over analog control? **(10 Marks)**

b. Explain briefly Batch control with a neat diagram. **(06 Marks)**

c. Explain Supervisory control with an example. **(04 Marks)**

3 a. Explain Pulse Interface for input and output operation, with a neat diagram. **(10 Marks)**

b. Explain the different forms of parallel computer architecture. **(10 Marks)**

4 a. Explain the basic interrupt input mechanism with diagram and flow chart. **(10 Marks)**

b. Explain the ISO seven layer model for Data Communication. **(10 Marks)**

5 a. How do strong data typing contribute to the security of programming language? **(06 Marks)**

b. List and explain various requirements in programming languages used in real-time applications. **(10 Marks)**

c. Explain briefly Declaration of variables and constant. **(04 Marks)**

6 a. Explain the approaches of application oriented software. **(10 Marks)**

b. Define the following with respect to real time programming languages:
(i) Scope and visibility
(ii) Global and local variables
(iii) Modularity
(iv) Derived data type
(v) Exception Handling **(10 Marks)**

7 a. Explain : (i) Task Chaining and Swapping (ii) Task overlaying **(07 Marks)**

b. Explain the task management system, with state of tasks. **(07 Marks)**

c. Explain the Scheduling policies. **(06 Marks)**

8 a. Explain with neat diagram structure of RTOS. **(07 Marks)**
b. Explain general structure of Input Output subsystem. **(06 Marks)**
c. Explain code sharing? Explain serially reusable and reentrant code. **(07 Marks)**

9 a. With a neat flow chart describe single program approach with reference to RTS design. **(10 Marks)**
b. Explain Foreground and Background systems with flow chart. **(10 Marks)**

10 a. Explain Yourdon methodology. **(05 Marks)**
b. Explain with relevant diagram the Ward and Mellor method. **(07 Marks)**
c. Write about Environmental model, with context diagram for Drying Oven. **(08 Marks)**

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17EC752

Seventh Semester B.E. Degree Examination, July/August 2021
IOT and Wireless Sensor Networks

Time: 3 hrs. Max. Marks: 100

Note: *Answer any FIVE full questions.*

1 a. Explain 4 – layers typical model of an IOT architecture with neat diagram. **(07 Marks)**
b. What are the advantages and disadvantages of IOT? **(07 Marks)**
c. What is industrial IOT(IIOT)? What are the challenges for implementing IIOT? **(06 Marks)**

2 a. List any four IOT reference architectures. Explain how IOT reference architectures simplify the development of IOT solutions. **(06 Marks)**
b. Explain with a diagram, 4-layer architectural framework developed for IOT smart city application by CISCO. **(07 Marks)**
c. Explain Constrained Application Protocol (COAP) for IOT/M2M. **(07 Marks)**

3 a. Explain an IPv6 addressing. What are its advantages? **(05 Marks)**
b. What is IOT device management? Explain the connected device management in gateway. **(10 Marks)**
c. Explain SaaS cloud service model with examples. **(05 Marks)**

4 a. Explain an IPv4 addressing. What are its disadvantages? **(06 Marks)**
b. What is IOT data management? Explain data management and consolidation in gateway. **(07 Marks)**
c. Explain different cloud deployment models for cloud services in IOT applications. **(07 Marks)**

5 a. Write the programming for Arduino controlled Traffic-Controlled Lights (TLs) at road junction with time intervals. **(12 Marks)**
b. Why security is required in IOT? Explain in detail various security models in IOT. **(08 Marks)**

6 a. Write the programming of Arduino for usage of RFID serial – data reading using UART port. **(10 Marks)**
b. Explain in detail the Vulnurabilitaties in Internet of Things. **(10 Marks)**

7 a. What is WSN? Explain the structure of WSNs with neat diagrams. **(08 Marks)**
b. Discuss in detail the design principles for WSN. **(08 Marks)**
c. Explain service interfaces of WSNs requirements? **(04 Marks)**

8 a. Define Wireless Sensor Networks. Explain the principle of operation of WSN with a neat diagram. **(06 Marks)**

b. Explain energy consumption issues in wireless sensor networks. **(06 Marks)**

c. Explain the major characteristics of sensor node used to evaluate the performance of WSN. **(08 Marks)**

9 a. List the factors that are essential for PHY design in WSNs. **(07 Marks)**

b. Differentiate between Contention-based MAC protocol and schedule-based MAC protocol. **(06 Marks)**

c. Explain the concept of TRAMA protocol. **(07 Marks)**

10 a. What is clustering? Explain in detail clustering principle in WSN. **(06 Marks)**

b. Explain the concepts of mediation device protocols. **(07 Marks)**

c. Explain briefly an energy – efficient unicast routing in WSN. **(07 Marks)**

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