Internal Assessment Test 3 Scheme & Solution – May 2022

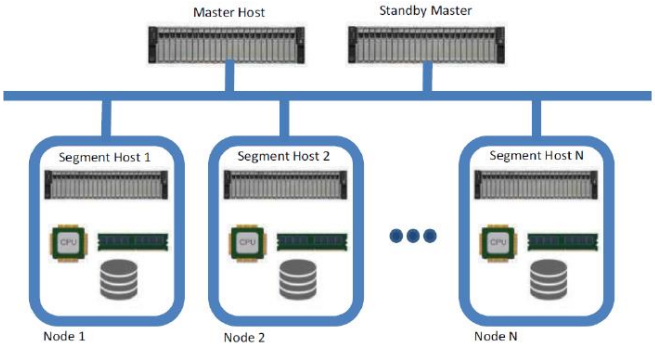
Sub:	Internet of Things					Sub Code:	18CS81	Branch:	ISE
Date:	18/06/22	Duration:	90 mins	Max Marks:	50	Version/ Sem / Sec:	A/VIII/A,B,C		OBE

		MARKS	CO	RBT
1.	Discuss Big Data analytics tools and technology in detail	[10]	CO4	L2

It involves the following

- Massively Parallel Processing Databases
- NoSQL Databases
- Hadoop
- YARN
- The Hadoop Ecosystem
- Apache Kafka
- Lambda Architecture

Massively Parallel Processing Databases: Massively parallel processing (MPP) databases were built on the concept of the relational data warehouses but are designed to be much faster, to be efficient, and to support reduced query times



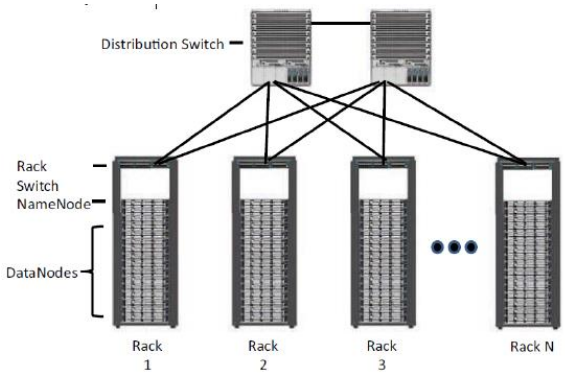
NoSQL Databases:

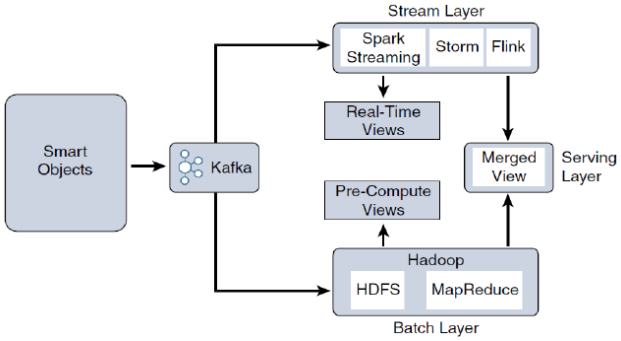
NoSQL ("not only SQL") is a class of databases that support semi-structured and unstructured data, in addition to the structured data handled by data warehouses and MPPs.

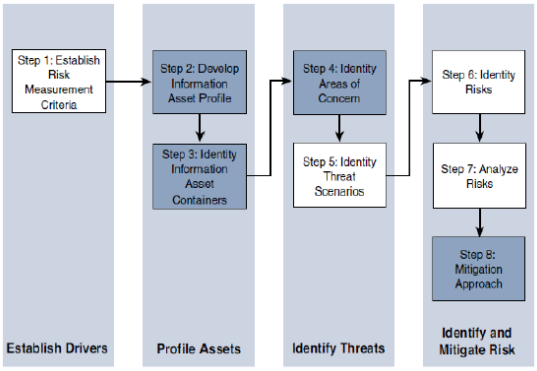
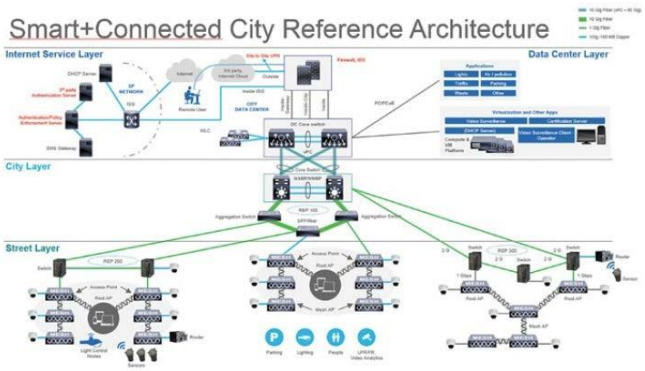
Hadoop

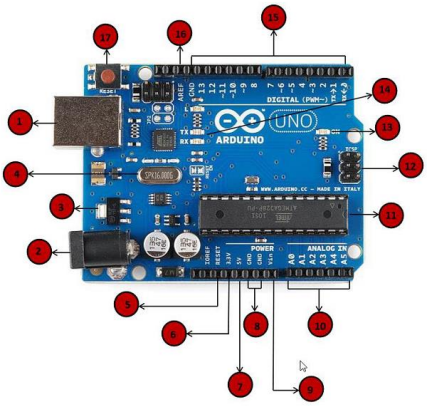
■ Hadoop Distributed File System (HDFS):

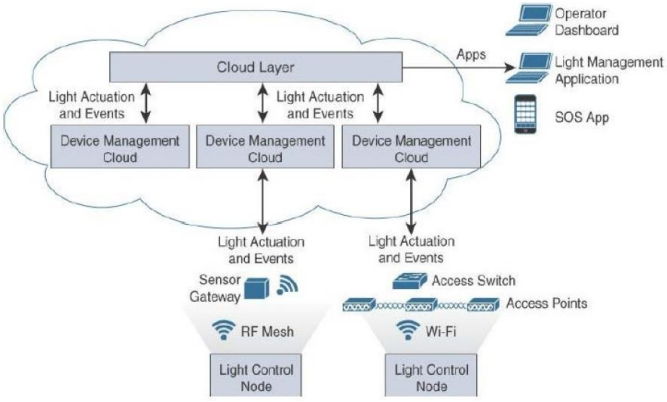
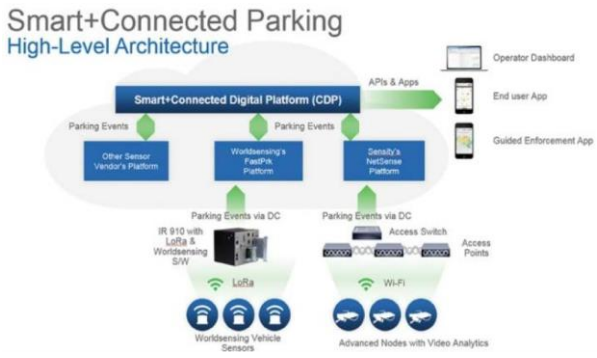
■ MapReduce:



	YARN: YARN (Yet Another Resource Negotiator) was designed to enhance the functionality of MapReduce. The Hadoop Ecosystem: Hadoop plays an increasingly big role in the collection, storage, and processing of IoT data due to its highly scalable nature and its ability to work with large volumes of data. Apache Kafka: Apache Kafka is a distributed publisher-subscriber messaging system that is built to be scalable and fast. Lambda Architecture: 			
2.	Discuss the following: a) Supervised Learning b) Unsupervised Learning c) Neural Networks a) Supervised Learning: In supervised learning, the machine is trained with input for which there is a known correct answer. For example, suppose that you are training a system to recognize when there is a human in a mine tunnel. b) Unsupervised Learning There will occasionally be an engine in the group that displays unusual characteristics. This is the engine that you send for manual evaluation. The computing process associated with this determination is called unsupervised learning. This type of learning is unsupervised because there is not a “good” or “bad” answer known in advance. b) Neural Networks Neural networks mimic the same logic. The information goes through different algorithms (called units), each of which is in charge of processing an aspect of the information. The resulting value of one unit computation can be used directly or fed into another unit for further processing to occur.	[10]	CO4	L2
3.	Demonstrate the OCTAVE and FAIR formal risk analysis in detail.	[10]	CO4	L2

	The first step of the OCTAVE Allegro methodology is to establish a risk measurement criterion. OCTAVE provides a fairly simple means of doing this with an emphasis on impact, value, and measurement. The point of having a risk measurement criterion is that at any point in the later stages, prioritization can take place against the reference model  The second step is to develop an information asset profile. The third step is to identify information asset containers. The fourth step is to identify areas of concern. In fifth step threat scenarios are identified. At the sixth step risks are identified. The seventh step is risk analysis. Finally, mitigation is applied at the eighth step. FAIR FAIR (Factor Analysis of Information Risk) is a technical standard for risk definition from The pen Group. FAIR places emphasis on both unambiguous definitions and the idea that risk and associated attributes are measurable. FAIR has a definition of risk as the probable frequency and probable magnitude of loss.			
4	Construct the Smart City Security Architecture Vast quantities of sensitive information are being shared at all times in a layered, real time architecture, and cities have a duty to protect their citizens' data from unauthorized access, collection, and tampering.  The following are common industry elements for security on the network layer:	[10]	CO5	L3

	Firewall: A firewall is located at the edge, and it should be IPsec- and VPN-ready, and include user- and role-based access control. **VLAN:** A VLAN provides end-to-end segmentation of data transmission, further protecting data from rogue intervention. **Encryption:** Protecting the traffic from the sensor to the application is a common requirement to avoid data tampering and eavesdropping.			
5 (a)	**Write a python program which monitors a temperature of an engine using DS18B20 Sensor and Raspberry Pi** Getting Started Configuring the Raspberry Pi Install the Python Library Enable the Interface Writing the Python Code Importing the libraries **Code:** import time Sensor sensor = W1ThermSensor() while True: print("The temperature is %s celsius" % temperature) time.sleep(1)	[05]	CO5	L3
(b)	Construct the ARDUINO UNO Learning Board. Arduino is an open-source advancement prototyping (development model) platform which depends on simple to utilize equipment and programming. • Instructions to the microcontroller are given by the use of Arduino programming. • Arduino software(IDE-Integrated improvement environment) The Arduino is a small computer that you can program to read information from the world around you and to send commands to the outside world.  Power USB Power (Barrel Jack) Voltage Regulator Crystal Oscillator Arduino Reset Pins (3.3, 5, GND, Vin) Analog pins Main microcontroller ICSP pin Power LED indicator	[05]	CO5	L3

	TX and RX LEDs Digital I/O AREF			
6	Prepare the case study of Smart and Connected Cities using Raspberry Pi There are multiple ways a smart city can improve its efficiency and the lives of its citizens. The following sections examine some of the applications commonly used as starting points to implement IoT in smart cities: connected street lighting, smart parking, smart traffic control, and connected environment. **Connected Street Lighting** Connected Street Lighting Solution Street Lighting Architecture  *Connected Lighting Architecture* **Smart Parking Use Cases** Contributes to pollution Causes motorist frustration Increases traffic incidents Cities often lose revenue Parking administration employee productivity suffers Parking availability affects income  Smart Traffic Control Smart Traffic Control Architecture Smart Traffic Applications	[10]	CO5	L3