Introduction to Internet of Things

Assignment-Week 9

TYPE OF QUESTION:MCQ/MSQ

Number of questions: **15** **Total marks: 15 X 1= 15**

QUESTION 1:

Which component of OpenStack do you use to access all the other components?

a. Horizon

b. Glance

c. Neutron

d. None of these

Correct Answer: a. Horizon

Detailed Solution: Horizon is the dashboard of OpenStack which provides the GUI and from where you can access other components. Please refer Lecture 41@3:54

QUESTION 2:

Which among the following is NOT a component of OpenStack?

a. Horizon

b. Heat

c. Plasma

d. Neutron

Correct Answer: c. Plasma

Detailed Solution: Plasma is not a component of OpenStack. The rest are various components, including Nova, Glance, Swift etc. Refer lecture 41, ppt No. 4

QUESTION 3:

Sensor cloud is simply dumping and organizing of sensor data on cloud computing platforms.

a. True

b. False

Correct Answer: b. False

Detailed Solution: Sensor cloud incorporates many aspects and not simply dumping of senor data over cloud platforms. Refer Lecture 42@3:45 onwards

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QUESTION 4:

Which among the following are limitations of traditional Wireless Sensor Networks (WSNs)?

a. Procurement Issues

b. Deployment Issues

c. Maintenance Issues

d. All of the given

Correct Answer: d. All of the given

Detailed Solution: For traditional WSNs, procurement, deployment and maintenance are all critical issues that needs to be taken care of. Refer Lecture 42@9:49 onwards.

QUESTION 5:

In a typical sensor cloud architecture, the sensor cloud infrastructure that provides the virtualization lies _____

a. At the same layer as physical sensor devices
b. At the application layer
c. In between the physical sensor layer and the application layer
d. Sensor cloud does not support virtualization

Correct Answer: c. In between the physical sensor layer and the application layer

Detailed Answer: In a typical sensor cloud architecture, the sensor cloud infrastructure that provides the virtualization lies in between the physical sensor layer and the application layer. Refer Lecture 42@12:00 onwards.

QUESTION 6:

Generally speaking, Sensor Cloud Service Providers (SCSPs) are also always the owners of the physical sensors

a. Yes
b. No

Correct Answer: b. No

Detailed Solution: SCSPs are providers of the virtualized sensor services, but they may not the owners of the physical sensors in a typical deployment. Refer Lecture 42, 'Actors in Sensor-cloud'.

QUESTION 7:

In a typical sensor cloud architecture with virtualization, one virtual sensor can be associated with how many physical sensors?

a. Only one
b. One or more than one
c. None
d. Only two

Correct Answer: b. One or more than one

Detailed Solution: One instance of a virtual sensor in sensor cloud architecture can be mapped with one, two or more physical sensors below. Refer Lecture 43, Optimal composition of virtual sensors

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QUESTION 8:

Sensor virtualization aims to achieve more _____ in providing sensor based services

a. Complexity

b. Flexibility

Correct Answer: b. Flexibility

Detailed Solution: Sensor virtualization and sensor cloud architecture are designed to provide more flexibility and convenience than traditional sensor based services. Refer to the lectures on Sensor Cloud and its motivation closely.

QUESTION 9:

Suppose that you want to start a business to provide some IoT based application, but you do not have the means to develop the application layer logic, neither you have the means to purchase and deploy physical sensors. You can however, rent cloud servers for use and write interface logic for interfacing with other modules. Which among the following actors will be the most suitable for you?

a. Physical sensor owner
b. Application layer developer
c. Sensor Cloud Service Provider (SCSP)
d. You cannot start the business

Correct Answer: c. Sensor Cloud Service Provider (SCSP)

Detailed Answer: SCSPs provide the sensor virtualization layer in between the application layer and the physical sensor layer and thus this is the best business model as per the requirements and constraints given. Refer to the standard architecture of sensor cloud and utility of SCSPs.

QUESTION 10:

Which among the following is implemented along with sensor cloud to make its services and performance better?

a. Cashing

b. Caching

c. Casing

d. Calling

Correct Answer: b. Caching

Detailed Solution: Caching is very important in sensor cloud and is implemented along with sensor cloud to make the performances better. Refer Lecture 43@17:38 onwards.

QUESTION 11:

Which among the following cases is most likely to reduce the overall price of sensor-cloud implementation provided that the data traverses through multiple sensor hops starting from the origin sensor to the sink node, and provided that all owners are honest and charge for only what is required?

a. If physical sensors are owned by multiple owners with high profit margin

b. If all physical sensors are owned by a single owner with uniform profit margin

Correct Answer: b. If all physical sensors are owned by a single owner with uniform profit margin

Detailed Solution: If all the physical sensors are owned by a single owner, then the single owner will charge an uniform price for data traversing through the sensors. On the other hand, if multiple sensor owners are there, different owners will charge different rates, which may increase the price. Refer pricing in sensor-cloud, Lecture 43@25:40 onwards.

QUESTION 12:

Fog computing is aimed to replace cloud computing completely and has no scope for integration with cloud

a. True

b. False

Correct Answer: b. False

Detailed Solution: Fog computing is designed to assist and compliment cloud based technologies in providing better services, not remove cloud all together. Refer Lecture 44@3:46 onwards, Introduction to Fog, especially how it is connected to cloud computing.

QUESTION 13:

Suppose data from an IoT device first goes to Fog layer for some basic processing, after which it goes to Cloud layer for advanced processing, then the processed data comes back to the Fog layer and then, it finally comes back to the origin sensor node. In the return journey no processing of data takes place anywhere, just transfer of data takes place. If 'Tf' is the time taken by the data to travel from sensor to fog and vice versa, and 'Tc' is the time taken by the data to travel from fog to cloud and vice versa, 'Tfp' is the data processing time at fog and 'Tcp' is the data processing time at cloud, what is the total round trip time 'T' taken by data starting from the origin sensor node, processing the data and then back to the sensor node after being processed.

a. T = Tf + Tc + Tfp + Tcp

b. b. T = Tf + Tc

c. T = 2(Tf + Tc) + Tfp + Tcp

d. T = 4(Tf + Tc + Tfp + Tcp)

Correct Answer: c. T = 2(Tf + Tc) + Tfp + Tcp

Detailed Solution: Since data comes back to the origin sensor node, the traversal latency Tf and Tc will be counted twice. But, since processing takes place only once during onward journey, processing delay is only one time. Therefore, T = 2(Tf + Tc) + Tfp + Tcp. Refer to the lecture on cloud latency, Lecture 44@14:28 onwards.

QUESTION 14:

Consider the standard Fog computing architecture. In which of the following layer will 'very time sensitive data' be processed?

a. Nearest fog node

b. Distant aggregate fog node

c. Cloud

d. Does not matter

Correct Answer: a. Nearest fog node

Detailed Solution: Since the data is very time sensitive, it is required that the nearest fog node processes the data so that immediate action can taken. This is the benefit of having fog computing. Refer to Working of Fog, Lecture 45@13:20 onwards.

QUESTION 15:

"Network, Accelerator, Compute and Storage" constitute the part of which view of fog computing architecture, as defined by *OpenFog Consortium Architecture Working Group?*

a. System View

b. Node View

c. Software View

d. None of these

Correct Answer: b. Node View

Detailed Solution: Fog Computing Architectural framework has several views, node, system and software among them. Network, Accelerator, Compute and Storage" fall under Node View. Refer Chapter 11 (Page 260) of "Introduction to IoT" by Sudip Misra, Anandarup Mukherjee, Arijit Roy, Cambridge University Press, 2021.

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