SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

QUESTION BANK

VII SEMESTER

1904011 – BIG DATA ANALYTICS

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UNIT 1 INTRODUCTION TO BIG DATA

Big Data – Definition, Characteristic Features – Big Data Applications - Big Data vs Traditional Data - Risks of Big Data - Structure of Big Data - Challenges of Conventional Systems - Web Data – Evolution of Analytic Scalability - Evolution of Analytic Processes, Tools and methods - Analysis vs Reporting - Modern Data Analytic Tools

PART – A

Q.No	Question	Competence	Level
1	What is Big Data?	Remember	BTL 1
2	Differentiate Big Data and Conventional Data.	Understand	BTL 2
3	List the various dimensions of growth of Big Data.	Remember	BTL 1
4	List the main characteristics of Big Data.	Remember	BTL 1
5	Illustrate the risk of big data.	Apply	BTL 3
6	What is web data?	Remember	BTL 1
7	List the sources of big data.	Remember	BTL 1
8	Analyse the challenges in big data.	Analyze	BTL 4
9	Why domain expertise is required for any type of DataAnalytics?	Remember	BTL 1
10	Givereason: "Web Data is the most popular Big Data".	Understand	BTL 2
11	Justify "Accuracy in big data is beneficial"	Evaluate	BTL 5
12	Give the structure of big data.	Understand	BTL 2
13	Give the list of bigdata applications.	Understand	BTL 2
14	Analyse the challenges of convectional system.	Analyze	BTL 4
15	Can you generalize the role of analytical scalability in big data.	Create	BTL 6
16	Analyse the structure of bigdata .	Apply	BTL 3
17	Illustrate how big data can be represented.	Apply	BTL 3
18	Assess the importance of analysis vs reporting	Evaluate	BTL 5
19	Analyse the technologies used to handle big data.	Analyze	BTL 4
20	Generalize what is a sand box.	Create	BTL 6
21	Give the traditional analytical architecture.	Understand	BTL 2
22	Analyse what are the challenges in data.	Analyze	BTL 4
23	Differentiate datawarehouse architecture vs MPP Architecture.	Apply	BTL 3
24	Summarize the data privacy.	Evaluate	BTL 5

PART-B

Q.No.	Question	Competence	Level
1	What is Bigdata? Describe the main features of a big data in detail. (13)	Remember	BTL 1
2	(i) List the main characteristics of big data. (4) (ii) Describe big data architecture with a neat schematic diagram. (9)	Remember	BTL 1

3	Formulate what is the risk in handling big data. (13)	Create	BTL 6
4	Describe the structure of big data representation (13)	Remember	BTL 1
5	(i) Point out the features of Massive parallel processing system. (5) (ii) Explain the use of Massive Parallel Processing system in big data analytics (8)	Analyze	BTL 4
6	Analyse the challenges faced by traditional system. (13)	Apply	BTL 3
7	Describe in detail the analysis tools and reporting tools used in Big-data. (13)	Understand	BTL 2
8	(i) What is a analytical data set ? (3) (ii) Explain the types of analytical data set (10)	Analyze	BTL 4
9	(i) Summarize what is web data. (6) (ii) Discuss what does the web data reveal. (7)	Understand	BTL 2
10	(i) Describe how big data are effectively filtered. (6) (ii) Describe how big data are mixed with traditional one. (7)	Remember	BTL 1
11	Analyse the Evolution Tools and Method in big data. (13)	Apply	BTL 3
12	(i) Assess the difficulties faced by conventional systems. (5) (ii) Explain the differences between big data from the traditional one. (8)	Evaluate	BTL 5
13	Summarizehow the analytical scalability is handled in big data. (13)	Understand	BTL 2
14	(i) Pointout some of the web data in current action today. (6) (ii) Analyse the modern tools for big data analysis. (7)	Analyze	BTL 4
15	Differentiate the Analysis and reporting methods and tools (13)	Understand	BTL 2
16	Summarize the importance of analytical sandbox in detail. (13)	Evaluate	BTL 5
17	Illustrate the Evolution of Analytical Scalability. (13)	Apply	BTL 3
PART - C			
1.	Generalize in detail about the challenges of the Bigdata (15)	Create	BTL 6
2.	Justify the Statement "Web Data is the Most Popular Big Data" with reference to data analytic professional. (15)	Evaluate	BTL 5
3.	Comment on the statement "Is the "Big" Part or the "Data" Part More Important " in the term bigdata. (15)	Evaluate	BTL 5
4.	Develop the role of Analytic Sandbox and its benefits in the Analytic Process. (15)	Create	BTL 6
5.	Explain the evolution of Analytical Scalability. (15)	Evaluate	BTL 5

UNIT II HADOOP FRAMEWORK

Distributed File Systems - Large-Scale FileSystem Organization – HDFS concepts - MapReduce Execution, Algorithms using MapReduce, Matrix-Vector Multiplication – Hadoop YARN			

PART – A

Q.No	Question	Competence	Level
1	What is hadoop?	Remember	BTL 1
2	Show how does Map-Reduce computation execute.	Apply	BTL 3
3	Generalize the key advantages in hadoop.	Create	BTL 6
4	What is hadoop YARN?	Understand	BTL 2
5	Listthe core concepts of HADOOP.	Remember	BTL 1
6	Define MAP REDUCE concepts.	Remember	BTL 1
7	Pointout how a key value pair is formed.	Analyze	BTL 4
8	Assess the importance of DFS.	Evaluate	BTL 5
9	Whatis HDFS?	Remember	BTL 1
10	Generalize the features of HDFS.	Create	BTL 6
11	Discuss about name node .	Understand	BTL 2
12	Whatare the goals of HDFS?	Remember	BTL 1
13	Showwhat is data node.	Apply	BTL 3
14	Analyze shuffle and sort algorithm	Analyze	BTL 4
15	Whatare theAdvantages of HDFS?	Understand	BTL 2
16	List out the hadoop applications.	Remember	BTL 1
17	Whatis matrix multiplication?	Understand	BTL 2
18	Relatewhy the partitions are shuffled in map reduce.	Apply	BTL 3
19	Point out the steps in mapreduce algorithm.	Analyze	BTL 4
20	Summarize application manager in hadoop.	Evaluate	BTL 5
21	Give the application of distributed system.	Understand	BTL 2
22	Show the importance of resource manager in Hadoop.	Apply	BTL 3
23	Expand YARN.	Analyze	BTL 4
24	Summarize the advantages of Hadoop.	Evaluate	BTL 5

PART-B

Q.No.	Question	Competence	Level
1	List the features of Hadoop and explain the functionalities of Hadoop? (13)	Remember	BTL 1
2	Discuss the various core components of the Hadoop. (13)	Understand	BTL 2
3	Explain about Hadoop distributed file system architecture with neat diagram. (13)	Evaluate	BTL 5
4	Summarize briefly on (i) Algorithms using MapReduce. (8) (ii) Advantages of MapReduce. (5)	Understand	BTL 2
5	Compare and Contrast the Hadoop and MapR. (13)	Analyze	BTL 4

6	Analyse the steps of Map Reduce Algorithms. (13)	Analyze	BTL 4
7	Describe the concepts of HDFS. (13)	Remember	BTL 1
8	(i) Identify the map and reduce algorithm in detail (6) (ii) Illustrate the map reduce algorithm with an example (7)	Apply	BTL 3
9	List the phases in mapreduce with an example. (13)	Remember	BTL 1
10	Analyze the Apache Hadoop YARN architecture. (7)	Analyze	BTL 4
11	(i) Describe Map Reduce framework in detail. Draw the architectural diagram (7) (ii) Define HDFS. Explain HDFS in detail. (6)	Remember	BTL 1
12	Discuss matrix vector multiplication in detail. (13)	Understand	BTL 2
13	(i) Explain what is YARN. (6) (ii) Illustrate HADOOP YARN architecture with neat diagram. (7)	Apply	BTL 3
14	Use map reduce architecture to illustrate the concept of hadoop for the following example Welcome to Hadoop class Hadoop is interesting Hadoop is useful Hadoop is useful in big data (13)	Create	BTL 6
15	Analyse the distributed file system. (13)	Apply	BTL 3
16	Discussthe benefits of using HDFS. (8) Discuss the benefits of HDFS in marketing application. (5)	Understand	BTL 2
17	Discuss HDFS data replication. (13)	Evaluate	BTL5

PART - C

1	Recommend a procedure to find the number of Occurrence of a word in a document. (15)	Evaluate	BTL 5
2	(i) Generalize with a neat sketch about processing of a job in Hadoop. (8) (ii) List the various operational modes of Hadoop cluster configuration and explain in detail about configuring / installing the hadoop in local/standalone mode (7)	Create	BTL 6
3	Summarize how google file system differs from the Hadoop file system and explain the google file system architecture with a neat sketch. (15)	Evaluate	BTL 5
4	Preparea Map-Reduce Algorithm to get the Dot Product of two Large Vectors. Assuming Only non-zero elements of those vectors are given in input files and output file should show only non-zero entries(assuming two vectors are same size) (15) ex: v1=[5 4 0 1 2] v2=[4 2 1 0 6] file1: file2: output: (0,5) (0,4) (0,20) (1,4) (1,2) (1,8) (3,1) (2,1) (4,12) (4,2) (4,6)	Create	BTL 6
5	Consider a collection of literature survey made by a researcher in the form of a text document with respect to cloud and big data analytics. Using Hadoop and Map Reduce, write a program to count the occurrence of pre dominant key words. (15)	Create	BTL 6

UNIT III - DATA ANALYSIS

Statistical Methods: Regression modelling, Multivariate Analysis - Classification: SVM & Kernel Methods - Rule Mining - Cluster Analysis, Types of Data in Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density Based Methods, Grid Based Methods, Model Based Clustering Methods, Clustering High Dimensional Data - Predictive Analytics – Data analysis using R.

PART – A

Q.No.	Question	Competence	Level
1	What is data analysis?	Remember	BTL 1
2	Show what classification is.	Apply	BTL 3
3	Generalize support-vector machines.	Create	BTL 6
4	Whatis regression?	Understand	BTL 2
5	List out the different types of regression	Remember	BTL 1
6	Define multivariate analysis.	Remember	BTL 1
7	Classifydifferent types of data analysis.	Analyze	BTL 4
8	Assess the importance of classification in data analysis.	Evaluate	BTL 5
9	What is kernal?	Remember	BTL 1
10	Generalize rule mining.	Create	BTL 6
11	Give the types of kernels.	Understand	BTL 2
12	What is Multiple Linear Regression?	Remember	BTL 1
13	Illustrate what is predictive analysis.	Apply	BTL 3
14	Differentiate regression and correlation.	Analyze	BTL 4
15	Whatis clustering?	Understand	BTL 2
16	Listthe types of clustering.	Remember	BTL 1
17	What is SVM?	Understand	BTL 2
18	Relateclassification and clustering.	Apply	BTL 3
19	Point outthe importance of clustering in data analysis.	Analyze	BTL 4
20	Summarizewhat is R.	Evaluate	BTL 5
21	Evaluate density based clustering..	Evaluate	BTL 5
22	What is the grid based clustering?	Analyze	BTL 4
23	List the types of hierarchical clustering.	Understand	BTL 2
24	Show partitioning methods in clustering.	Apply	BTL 3

PART-B

Q.No.	Question	Competence	Level
1	(i) What is regression? List the types of regression. (5) (ii) Examine the purpose of using Regression Modeling in Data Analysis. (8)	Remember	BTL 1
2	(i) Assess when we use multivariate analysis. (5) (ii) Explain in detail about the various Multivariate Analysis	Evaluate	BTL 5

	Techniques with examples (8)		
3	(i) Describe SVM in detail. (7) (ii) List out and explain some of the applications of SVM in detail (6)	Remember	BTL 1
4	Explain about kernel methods in detail. (13)	Analyze	BTL 4
5	Give a short note on types of data in clustering and its Importance. (13)	Understand	BTL 2
6	(i) Discuss in detail about the rule mining. (6) (ii) Explain in detail about association rule mining (7)	Understand	BTL 2
7	(i) Examine clustering in data analysis. (3) (ii) Illustrate density based and Grid based clustering in detail(10)	Apply	BTL 3
8	Describe how clustering is used in high dimensional data. (13)	Remember	BTL1
9	Illustrate the approaches of clustering. (13)	Apply	BTL 3
10	Discuss model based clustering and high dimensional clustering in detail. (13)	Understand	BTL 2
11	Describe partitioning method of clustering in detail. (13)	Remember	BTL 1
12	Explain k-means clustering algorithm with an example. (13)	Analyze	BTL 4
13	(i) What is prediction? Generalize how prediction helps in data analysis. (5) (ii) Explain in detail about predictive analysis (8)	Create	BTL 6
14	Analyze the different hierarchical clustering techniques (13)	Apply	BTL 3
15	Discuss the model based clustering. (13)	Understand	BTL2
16	Explain the density based clustering with a neat diagram. (13)	Analyse	BTL 4
17	Summarize grid based clustering in detail. (13)	Evaluate	BTL 5

PART – C

1	Comment the statement in detail:"Data Analysis is not a decision-making system, but a decision-supporting system".(15)	Analyze	BTL 6
2	Createa Regression Model for " happy people get many hours of sleep" using your own data and what kind of inferences it provides. (15)	Create	BTL 6
3	Summarize hierarchical clustering in detail. Analyse the given diagram and draw the dendrogram using hierarchical clustering algorithm. (15) 	Evaluate	BTL 5
4	Compose the K-means partitioning algorithm using the given data. Cluster the following eight points (with (x, y) representing locations) into three clusters: (15) A1(2, 10), A2(2, 5), A3(8, 4), A4(5, 8), A5(7, 5), A6(6, 4), A7(1, 2), A8(4, 9)	Create	BTL 6

5	Summarize predictive analysis with some application. (15)	Evaluate	BTL 5

UNIT IV MINING DATA STREAMS

Streams: Concepts – Stream Data Model and Architecture - Sampling data in a stream - Mining Data Streams and Mining Time-series data - Real Time Analytics Platform (RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions

PART – A

Q.No.	Question	Competence	Level
1	List the main characteristics of stream sources.	Remember	BTL 1
2	Whatis a data stream?	Remember	BTL 1
3	Analyse why data stream management is relevant in data mining.	Analyze	BTL 4
4	Definewhat is meant by data stream.	Remember	BTL 1
5	What is Sampling data in a stream?	Remember	BTL 1
6	List out the few challenges of data stream mining algorithms.	Remember	BTL 1
7	Differentiate between DBMS and DSMS.	Understand	BTL 2
8	Analyse the statement "Filtering a Data Stream".	Apply	BTL 3
9	Givethe applications of DSMS.	Understand	BTL2
10	What is Real-Time Analysis?	Understand	BTL 2
11	Show how to deal with infinite streams.	Apply	BTL 3
12	What is a Data Stream Management System?	Remember	BTL 1
13	Show what examples you can find for stream sources.	Apply	BTL 3
14	What is called Data Stream Mining?	Understand	BTL 2
15	Compare and contrast RTAP (real time analytics platform) and RTSA (real time sentiment analysis)?	Analyze	BTL 4
16	Analyse why we need RTAP.	Analyze	BTL 4
17	Evaluate what is Real Time Analytics Platform (RTAP).	Evaluate	BTL 5
18	Compute the surprise number (second moment) for the stream 3, 1, 4, 1, 3, 4, 2, 1, 2. What is the third moment of this stream?	Evaluate	BTL 5
19	Generalize real time data.	Create	BTL 6
20	Generalize what information is used to substitute the view of streams over databases?	Create	BTL 6
21	Evaluate the importance of social media analytics.	Evaluate	BTL 5
22	Give the reasons why do we need RTAP.	Understand	BTL 2
23	Analyse prediction and forecasting.	Analyse	BTL 4
24	Illustrate whatis time series data.	Apply	BTL 3

PART-B

Q.No.	Question	Competence	Level
1	(i) Define data stream. (3) (ii) Describe the Data Stream model with a neat architecture diagram (10)	Remember	BTL 1
2	Illustrate briefly about the sources of data stream. (13)	Apply	BTL 3
3	Based on what you know, Analyse how would you partition the	Analyze	BTL 4

	following bit stream into buckets 1001011011101? Find all of them? (13)		
4	Summarize the stream data model and its architecture. (13)	Understand	BTL 2
5	Analyse and write a short note on Aurora system model. (13)	Analyze	BTL 4
6	(i) Explain Sampling in Data Streams. (5) (ii) Explain the sampling types in detail (8)	Remember	BTL 1
7	Describe about Aurora query model. (13)	Understand	BTL 2
8	Generalize how mining is done with data streams. (13)	Create	BTL 6
9	(i) Describe briefly how to count the distinct elements in a stream. (9) (ii)What do you meant by count–distinct problem. (4)	Understand	BTL 2
10	Quoteshort notes on (i) Sliding window concept (7) (ii) Land mark window concept (6)	Remember	BTL 1
11	Illustrate how would you describe the various windowing approach to data stream mining. (13)	Apply	BTL 3
12	(i) List the methods for analyzing time series data. (7) (ii) What are the several types of motivation and data analysis available for time series? (6)	Remember	BTL 1
13	(i) Illustrate what approaches are used to estimate the moments. (8) (ii) Examine the function cost of exact counts. (5)	Analyze	BTL 4
14	(i) Evaluate what is real time sentiment analysis. (5) (ii) Assess how the mining concept is used in real time sentiment analysis . (8)	Evaluate	BTL 5
15	Illustrate can you identify the following? (13) Suppose our stream consists of the integers 3, 1, 4, 1, 5, 9, 2, 6, 5. Our hash functions will all be of the form $h(x) = ax+b \bmod 32$ for some a andb. You should treat the result as a 5-bit binary integer. Determine the tail length for each stream element and the resulting estimate of the number of distinct elements if the hash function is: (a) $h(x) = 2x + 1 \bmod 32$. (b) $h(x) = 3x + 7 \bmod 32$. (c) $h(x) = 4x \bmod 32$	Apply	BTL 3
16	(i) Express what bloom filters are. (3) (ii) Summarize the relevance of bloom filters in data mining. (10)	Evaluate	BTL 5
17	Describe how is data analysis used in (i) stock market predictions. (7) (ii) weather forecasting predictions. (6)	Understand	BTL 2
PART – C			
1	Evaluate the process of Data Stream Mining with suitable examples. (15)	Evaluate	BTL 5
2	Summarize data streaming algorithms in detail. Evaluatekey stream mining problems and discuss the challenges associated with each problem. (15)	Evaluate	BTL 5
3	Generalize data stream management systems in detail. (15)	Create	BTL 6
4	Prepare a generic design for Realtime Analytics Platform (RTAP). Discuss your answer related to real time sentiment analysis. (15)	Create	BTL 6
5	Evaluate the Bloom Filter in detail with an algorithm. Apply this bloom filter algorithm in Adhar card(Unique Identification number) (15)	Evaluate	BTL 5

UNIT VBIG DATA FRAMEWORKS

Introduction to NoSQL – Aggregate Data Models – Hbase: Data Model and Implementations – Hbase Clients – Examples – .Cassandra: Data Model – Examples – Cassandra Clients – Hadoop Integration. Pig – Grunt – Pig Data Model – Pig Latin – developing and testing Pig Latin scripts. Hive – Data Types and File Formats – HiveQL Data Definition – HiveQL Data Manipulation – HiveQL Queries

PART – A

Q.No.	Question	Competence	Level
1	What is NoSQL?	Remember	BTL 1
2	Describe why do we need NoSQL.	Understand	BTL 2
3	Deduce the components of Hadoop framework.	Evaluate	BTL 5
4	Pointoutthe categories of NoSQL.	Analyze	BTL 4
5	What is the advantage of NoSQL?	Remember	BTL 1
6	Give the disadvantages of NoSQL.	Understand	BTL 2
7	What is HBase?	Remember	BTL 1
8	Show the advantage of Cassandra.	Apply	BTL 3
9	Who is generating big data and what are the ecosystem projects used for processing?	Create	BTL 6
10	Illustrate the difference between HBase and Hive.	Apply	BTL 3
11	Listthe aggregate data models.	Remember	BTL 1
12	Expresswhat is Pig in Hadoop.	Understand	BTL 2
13	What is Apache pig?	Remember	BTL 1
14	Illustratethe difference between Pig and Hive.	Apply	BTL 3
15	Classifythe usage of Pig, Hive and HBase.	Analyze	BTL 4
16	Give the features of Hive.	Understand	BTL 2
17	Explain Pig, Hive and HBase	Analyze	BTL 4
18	What is hive in Big Data?	Remember	BTL 1
19	Assess what is Cassandra Client.	Evaluate	BTL 5
20	List out the types of builtin operator in HIVE.	Create	BTL 6
21	Differentiate Row-Oriented vs. Column-Oriented data stores	Apply	BTL 3
22	Define The Role Of Hmaster in Hbase.	Analyse	BTL 4
23	Evaluate the importance of Cassandra.	Evaluate	BTL 5
24	Give the types of data modeling.	Understand	BTL 2

PART-B			
Q.No.	Question	Competence	Level
1	(i) Describe what is NoSQL. (7) (ii) List the advantages and disadvantages of NoSQL. (6)	Remember	BTL 1
2	(i) Illustrate in detail about Hive data manipulation, queries, and data types. (8) (ii) Illustrate data definition in Hive. (5)	Apply	BTL 3
3	Describe the system architecture and components of Hive and Hadoop. (13)	Remember	BTL 1
4	Explain briefly on aggregate data models. (13)	Analyze	BTL 4
5	Generalize Pig in detail. (13)	Create	BTL 6
6	(i) Describe about HBase in detail. (7) (ii) Explain Hbase clients in detail. (6)	Remember	BTL 1

7	(i) Analyse how Cassandra is integrated with Hadoop. (6) (ii) Explain the tools related to Hadoop. (7)	Apply	BTL 3
8	Summarize briefly on Hbase architecture with neat diagram (13)	Understand	BTL 2
9	Quote short notes on (i) Conceptual data modeling. (4) (ii) Logical data modeling. (4) (iii) Physical data modeling (5)	Remember	BTL 1
10	Discuss about Cassandra clients. (13)	Understand	BTL 2
11	Compare and Contrast the Hbase and Hive. (13)	Analyze	BTL 4
12	(i) Explain about Pig in detail. (7) (ii) What is invoking a Grunt shell? (6)	Analyze	BTL 4
13	Describe about Pig data model in detail with neat diagram. (13)	Understand	BTL 2
14	(i) Assess the difference between hive and map reduce. (4) (ii) Explain about Hive in detail. (9)	Evaluate	BTL 5
15	Discuss data modeling in detail. (13)	Understand	BTL 2
16	Evaluate hive data types and file formats. (13)	Evaluate	BTL 5
17	Illustrate in detail Hive QL (13)	Apply	BTL 3
PART - C			
1	Recommend a procedure to find the number of occurence of a word in a document using Hive. (15)	Evaluate	BTL 5
2	Evaluate the use of Hive.How Does Hive Interact With Hadoop explain in detail? (15)	Analyze	BTL 5
3	Perform analysis on web server report (15) Sample Data: teleman.pr.mcs.net,-,-,[01/Jul/2005:00:03:57,-0400],"GET,/images/KSC-logosmall.gif,HTTP/1.0",304,0 teleman.pr.mcs.net,-,-,[01/Jul/2005:00:03:57,-0400],"GET,/images/KSC-logosmall.gif,HTTP/1.0",304,0 The data is comma separated. It consists of the user IP address, time at which the request is received, timezone, request type, requested link, request details, response code and bytes transferred. Usually the scale of these datasets is quite huge and running queries in a conventional method is not possible. Hence use Pig programming on this dataset to retrieve the necessary statistics which helps us to understand the load and usage of the server, user visit frequency, webpage popularity and the total bytes transferred.	Create	BTL 6
4	Formulate a Hbase table from the following data (15) Data_file.txt contains the below data 1,India,Bihar,Champaran,2009,April,P1,1,5 2,India, Bihar,Patna,2009,May,P1,2,10 3,India, Bihar,Bhagalpur,2010,June,P2,3,15 4,United States,California,Fresno,2009,April,P2,2,5 5,United States,California,Long Beach,2010,July,P2,4,10 6,United States,California,San Francisco,2011,August,P1,6,20	Create	BTL 6

	Column family region has three column qualifiers: country, state, city Column family Time has two column qualifiers: year, month			
5	(i) Explain what is Apache Cassandra? (5) (ii) Cassandra has become so popular because of its outstanding technical features. Comment on this statement. (10)	Evaluate	BTL5