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| **Programming Paradigms** | | | | |
| **Year** | **No.** | **Question** | **Marks** | **Answers** |
| 16/17 | 2 | Within the context of object-oriented programming, the term “encapsulation” denotes the practice to hide implementation details of one object from other objects. Explain why this is useful. | 10 | Binding the data with the code that manipulates it or keep the code and its data safe from the external interfaces called Encapsulation. The encapsulation is improving maintainability and flexibility and also re-usability. The implementation is purely hidden for outside of the classes, but still the classes can access to the private fields using the same methods which are implemented when implementing the code. The main advantage of this is the user cannot see what is going on behind the codes. As an example, when user looking at the getters and setters, they will see to update a field call set method and to read a field call get method, but what these methods are actually doing is purely hidden by the use of encapsulation. |
| 15/16 | 2) a. | There are a number of different reasons why programming languages exist. Provide four examples of a programming language and discuss the reasons why these programming languages were developed. [20 marks] | 20 | **Java**  Java was originally designed for interactive television, but it was too advanced technology for the digital cable television industry at the time. The history of java starts with the Green Team. Java team members (also known as Green Team), initiated this project to develop a language for digital devices such as set-top boxes, televisions, etc.  Java is a general purpose, high-level programming language developed by Sun Micro systems. The Java programming language was developed by a small team of engineers, known as the Green Team, who initiated the language in 1991. Originally called OAK, the Java language was designed for handheld devices and set-top boxes.  Currently, Java is used in internet programming, mobile devices, games, e-business solutions, etc. There are given the significant points that describe the history of Java.  <https://www.quora.com/Why-was-Java-created>  <https://www.coderglass.com/java/java-introduction.php>  **Python**  Python is a widely used general-purpose, high-level programming language. It was initially designed by Guido van Rossum in 1991 and developed by Python Software Foundation. It was mainly developed for emphasis on code readability, and its syntax allows programmers to express concepts in fewer lines of code.  <https://www.geeksforgeeks.org/history-of-python/>  **C#**  C# is a modern object-oriented programming language developed in 2000 by Anders Hejlsberg at Microsoft as a rival to Java (which it is quite similar to). It was created because Sun, (later bought by Oracle) did not want Microsoft to make changes to Java, so Microsoft chose to create their own language instead. C# has grown quickly since it was first created, with extensive support from Microsoft helping it to gain a large following; it is now one of the most popular programming languages in the world. |
| 14/15 | 2)  c. | An Object is defined by identity, state and behaviour. In contrast to that, what defines a class? [9 marks] | 9 |  |
| 13/14 | 2)  a. | Discuss why it is important to have software standards. (7 marks) | 7 |  |
| 13/14 | 2)  c. | On the example of the programming language Java discuss who owns and maintains this programming language (5 marks) and how further changes to this programming language are managed (5 marks) | 10 |  |
| 12/13 | 5 | Crosscutting as a problem in software modularization refers to a situation where two properties being programmed must compose differently and yet to be coordinated. Which programming paradigm aims to extend the concept of object orientation to facilitate modularization in such situations? (2 marks) Name a programming language that implements this paradigm. (2 marks) | 4 |  |
| 12/13 | 6 | What programming paradigm is best suited to be used in the programming of Graphical User Interfaces (GUI)? | 4 |  |
| 11/12 | 2 | The programming language AspectJ became the de facto standard for implementing which programming paradigm? | 2 | Aspect Oriented Programming |
| 11/12 | 3 | Classes and Objects: A class is defined by a unique name, attributes, and methods. In contrast to that, what defines an object? | 2 |  |
| 11/12 | 10 | An ‘interface’ in object oriented terminology is a certain type of an abstract class. What distinguishes an interface from an abstract class? | 2 |  |
| 11/12 | 13 | What are typical reasons that programming languages come into existence? By giving four different examples, justify the development of a new programming language. (5 marks each) | 20 |  |
| 10/11 | 1 | What programming paradigm is best suited to be used in the programming of Graphical User Interfaces (GUI)? | 2 |  |
| 10/11 | 3 | Object Oriented Programming is about sending messages from one object to another object. How is the “sending of messages” implemented in main-stream 3rd generation languages such as C, C#, or Java? | 2 |  |