Chapter 106
Object–Oriented Programming in Computer Science

Rahime Yilmaz
Istanbul University, Turkey

Anil Sezgin
Yildiz Technical University, Turkey

Sefer Kurnaz
Istanbul Esenyurt University, Turkey

Yunus Ziya Arslan
Istanbul University, Turkey

ABSTRACT

A program is composed of commands that run within a computer or an electronic circuit. Programming is a mathematical methodology to write a program and to encode the algorithm into a notation. It can be classified into two groups such as system and application programming. System programming is a branch of the general programming that is composed of low-level instructions which are used to operate and handle computer hardware. Application programming is considered as the improved version of the computer programs that can perform specific tasks. One of the application programming types is the object-oriented programming (OOP) which is about how information is represented in human mind. OOP is useful to provide easy modeling in design and developing real entities. This approach is aimed to model the entities and the relationships existing between them. OOP enables to define the required classes to create the objects and to apply modifications on them. The inherent properties of OOP are modularity, extensibility, and reusability. This chapter provides a substantial survey of OOP.

INTRODUCTION

In computer science, a program is composed of a series of commands, which runs within a computer or an electronic circuit, producing information for users. Programming is a that can help programmers while writing a program. Computer programming is the process of writing an algorithm and, it is also

the encoding of the algorithm into a notation that can produce and provide information to the users. It can be classified into two groups, that is, system programming and application programming. System programming is a sub branch of the general programming that is composed of low level instructions which are used to operate and handle computer hardware. Application programming is considered as the improved version of the computer programs which can perform specific tasks for the users. One of the application programming types is the object oriented programming (OOP) which is about how information is represented in human mind.

As a computer programming approach, OOP is useful such that it provides easy modeling in designing and developing real entities. This approach is intended to model the entities and, also, the relationships existing between them. OOP allows programmers to define the required classes to create the objects and to apply modifications (manipulations) on them. It can also supply inheritance, polymorphism and encapsulation features to the developers. With these capabilities, the processed data can be isolated from other redundant applications. Because of its abilities that are readily available to the users, OOP is preferred much more than other available programming languages. The inherent properties of OOP, which do not exist in other application programming, can be stated as modularity, extensibility and reusability. This chapter provides a substantial survey of OOP in computer science.

In this chapter, we have highlighted a number of explanations and reviews that are generally accepted and are in common use in OOP. We explain the heart of this chapter OOP concept in section 1, Object Oriented Programming Features, making up the largest section. Main topic of OOP which are included Inheritance, Polymorphism, Abstraction and Encapsulation titles are explained with details in the subtitles of section 1. In section 2, you can find an example of OOP implementation in Java. There are many kinds of OOP languages in use but in this study, Java was given as a strong example to OOP language (Harel, Marron, & Weiss, 2010). The following section is Future Research Directions which include future works related OOP. The chapter ends with Conclusion section that gives a brief information about this study.

BACKGROUND

Programming paradigm is a fundamental style of computer programming which classifies programming languages. Different programming paradigms were developed by considering the concepts and abstraction which are used to represent the elements of a program, and steps that compose a computation. Some of the programming languages are designed to support one paradigm and some of them support multiple paradigms. Before OOP languages, there are also some other paradigms such as classic programming, modular programming and structural programming (Bista, Bajracharya, & Dongol, 2015). These programming technics were helped the programmers while solving their problems. Depending on improving technology, new structure of OOP has emerged so one of these paradigms is OOP which changed radically the programming paradigm continued until the day it appeared. Software methodology used before OOP referred to by the name of the procedural programming. This methodology was based on advancing codes in a particular direction and calling the common function that is used to reduce the workload. This methodology, used in the software world for a long time, has some difficulties. First of all, application of the procedural programming developed as a whole cannot be divided. So, each developer working on the application has to know almost every building of application. Due to its building as a whole, it is hard to make changes on the application. The reason of these difficulties is that procedural

Related Content

Mobile GPU Computing Based Filter Bank Convolution for Three-Dimensional Wavelet Transform
Di Zhao (2016). *International Journal of Mobile Computing and Multimedia Communications (pp. 22-35).*
www.irma-international.org/article/mobile-gpu-computing-based-filter-bank-convolution-for-three-dimensional-wavelet-transform/161754

The Ontology of Randomness
Jeremy Horne (2019). *Advanced Methodologies and Technologies in Network Architecture, Mobile Computing, and Data Analytics (pp. 427-439).*
www.irma-international.org/chapter/the-ontology-of-randomness/214633

Do Mobile CRM Services Appeal to Loyalty Program Customers?
Veronica Liljander, Pia Polsaand Kim Forsberg (2009). *Mobile Computing: Concepts, Methodologies, Tools, and Applications (pp. 1911-1928).*
www.irma-international.org/chapter/mobile-crm-services-appeal-loyalty/26636

Interference Modeling and Analysis in Cognitive Radio Networks
Yanxiao Zhao, Bighnaraj Panigrahi, Kazem Sohrabyand Wei Wang (2013). *International Journal of Handheld Computing Research (pp. 1-15).*
www.irma-international.org/article/interference-modeling-and-analysis-in-cognitive-radio-networks/103150

Hype or Ready for Prime Time?: Speech Recognition on Mobile Handheld Devices (MASR)
Dongsong Zhang, Hsien-Ming Chouand Lina Zhou (2012). *International Journal of Handheld Computing Research (pp. 40-55).*
www.irma-international.org/article/hype-ready-prime-time/73805