

# Teaching Programming and Design-by-Contract

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**Abstract.** This paper summarizes the experience of teaching an introductory course to programming by using a correctness by construction approach at Innopolis University, Russian Federation. In this paper we claim that division in beginner and advanced groups improves the learning outcomes, present the discussion and the data that support the claim.

## 1 Introduction

Formal methods are still struggling to get a broad acceptance in industry worldwide, and Russia is not an exception. Innopolis is a new IT city [7], incorporating a technopark and a university, aiming at prioritizing the development of IT and software engineering in Tatarstan and in the Russian Federation. Innopolis University (IU) is pioneering several research and pedagogical projects and experiments with innovative teaching methods and curricula. One of the numerous peculiarities of this innovation has been the decision to teach formal methods and correctness by construction together with programming since the first year of the bachelor program. In particular the Eiffel programming language [9] is used as a programming instrument and Design by Contract as a methodological and conceptual tool [8].

This paper summarizes the experience accumulated by following this pedagogical approach. It also reports on the course structure and answers questions related to setup, programming language and chosen paradigm. The work is structured as following: Section 2 motivates the choice of adopting Eiffel as first programming language to be studied. Section 3 describes the structure of the course and the Design by Contract approach adopted. Section 4 reports empirical results on our teaching effort: a poll was presented to students and some data collected. Finally, the numerical data presented is then analyzed and commented in Section 5.

## 2 Eiffel as first language

The choice of Eiffel and Design by Contract as programming and methodological tools for first year bachelors has been long discussed inside the university. After

# Class Interface Design And Programming By Contract

**Albert A Gayle**



## **Class Interface Design And Programming By Contract:**

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### **Table of Contents Class Interface Design And Programming By Contract**

1. Understanding the eBook Class Interface Design And Programming By Contract
  - The Rise of Digital Reading Class Interface Design And Programming By Contract
  - Advantages of eBooks Over Traditional Books
2. Identifying Class Interface Design And Programming By Contract
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Class Interface Design And Programming By Contract
  - User-Friendly Interface
4. Exploring eBook Recommendations from Class Interface Design And Programming By Contract
  - Personalized Recommendations
  - Class Interface Design And Programming By Contract User Reviews and Ratings

- Class Interface Design And Programming By Contract and Bestseller Lists
- 5. Accessing Class Interface Design And Programming By Contract Free and Paid eBooks
  - Class Interface Design And Programming By Contract Public Domain eBooks
  - Class Interface Design And Programming By Contract eBook Subscription Services
  - Class Interface Design And Programming By Contract Budget-Friendly Options
- 6. Navigating Class Interface Design And Programming By Contract eBook Formats
  - ePub, PDF, MOBI, and More
  - Class Interface Design And Programming By Contract Compatibility with Devices
  - Class Interface Design And Programming By Contract Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Class Interface Design And Programming By Contract
  - Highlighting and Note-Taking Class Interface Design And Programming By Contract
  - Interactive Elements Class Interface Design And Programming By Contract
- 8. Staying Engaged with Class Interface Design And Programming By Contract
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Class Interface Design And Programming By Contract
- 9. Balancing eBooks and Physical Books Class Interface Design And Programming By Contract
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Class Interface Design And Programming By Contract
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Class Interface Design And Programming By Contract
  - Setting Reading Goals Class Interface Design And Programming By Contract
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Class Interface Design And Programming By Contract
  - Fact-Checking eBook Content of Class Interface Design And Programming By Contract
  - Distinguishing Credible Sources

13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks
14. Embracing eBook Trends
  - Integration of Multimedia Elements
  - Interactive and Gamified eBooks

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