

# Learning Oracle PL SQL

Learning Oracle PL SQL Learning Oracle PL/SQL is a valuable skill for database administrators, developers, and anyone involved in managing or developing Oracle databases. PL/SQL (Procedural Language/Structured Query Language) is Oracle Corporation's procedural extension to SQL, enabling developers to write complex programs, automate tasks, and optimize database operations. Mastering PL/SQL can significantly enhance your ability to create efficient, scalable, and secure database applications. --- Understanding the Basics of Oracle PL/SQL What is PL/SQL? PL/SQL is a procedural language designed specifically for Oracle databases. It combines SQL's data manipulation capabilities with procedural programming constructs such as loops, conditions, and variables. This integration allows for the development of sophisticated database applications that can perform multiple tasks in a single block of code, reducing network traffic and improving performance. Why Learn Oracle PL/SQL? - Enhanced Performance: PL/SQL blocks execute on the server, minimizing data transfer between applications and the database. - Automation: Automate repetitive tasks like data validation, reporting, and batch processing. - Security: Encapsulate business logic within stored procedures and functions, providing a layer of security and access control. - Scalability: Write reusable code that can be shared across multiple applications. - Integration: Seamlessly integrates with other Oracle tools and technologies, such as Oracle Forms, Reports, and Application Express. --- Getting Started with Oracle PL/SQL Prerequisites Before diving into PL/SQL, it's essential to have a foundational understanding of: - Basic SQL commands (SELECT, INSERT, UPDATE, DELETE) - Relational database concepts - Basic programming principles (variables, control structures) Setting Up Your Environment To practice and develop PL/SQL code, you need access to an Oracle database environment. Options include: - Oracle Database Express Edition (XE): A free, lightweight 2 version suitable for learners. - Oracle SQL Developer: A free IDE for writing and executing SQL and PL/SQL code. - Third-party tools: Such as TOAD or PL/SQL Developer. --- Core Concepts of Oracle PL/SQL PL/SQL Blocks A PL/SQL program is structured into blocks, which consist of three sections: - Declaration Section: Declares variables, constants, cursors, etc. - Execution Section: Contains the executable statements. - Exception Handling Section: Manages errors and exceptions. Example: ``sql DECLARE v\_employee\_id NUMBER := 101; BEGIN -- Executable statements UPDATE employees SET salary = salary \* 1.10 WHERE employee\_id = v\_employee\_id; EXCEPTION WHEN NO\_DATA\_FOUND THEN DBMS\_OUTPUT.PUT\_LINE('Employee not found.'); END; `` Variables and Data Types PL/SQL supports various data types, such as: - Scalar types: NUMBER, VARCHAR2, DATE, BOOLEAN - Composite types: RECORD, TABLE - LOB types: CLOB, BLOB Proper declaration and initialization of variables are crucial for writing efficient code. Control Structures Control structures manage the flow of execution: - IF-THEN-ELSE statements - CASE statements - LOOPS (WHILE, FOR, LOOP) - EXIT and CONTINUE statements --- Developing Skills in Oracle PL/SQL Learning Syntax and Writing Simple Programs Start with understanding the syntax for basic blocks, variable declarations, and simple queries. Practice writing small scripts that perform data retrieval, updates, and inserts. Using Cursors and Loops Cursors allow for row-by-row processing of query result sets. Learning to declare, open, fetch, and close cursors is essential for handling complex data manipulation. Exception Handling and

Debugging Effective error handling improves the robustness of your applications. Learn to use exception blocks and built-in procedures like `DBMS\_OUTPUT.PUT\_LINE` to debug code.

### 3 Creating Stored Procedures and Functions

Stored procedures and functions encapsulate reusable logic:

- Procedures: Perform actions, do not return values.
- Functions: Return a value after execution.

Example: ``sql CREATE OR REPLACE FUNCTION get\_employee\_name(p\_employee\_id NUMBER) RETURN VARCHAR2 IS v\_name VARCHAR2(100); BEGIN SELECT first\_name || ' ' || last\_name INTO v\_name FROM employees WHERE employee\_id = p\_employee\_id; RETURN v\_name; EXCEPTION WHEN NO\_DATA\_FOUND THEN RETURN 'Not Found'; END; ``

### Triggers and Packages

- Triggers: Automatically execute in response to database events.
- Packages: Group related procedures, functions, variables, and cursors for modular design.

### Advanced Topics in Oracle PL/SQL

Bulk Processing and Performance Optimization Using `BULK COLLECT` and `FORALL` statements reduces context switches between SQL and PL/SQL, improving performance during large data operations.

### Dynamic SQL

Dynamic SQL allows execution of SQL statements constructed at runtime, increasing flexibility.

### Designing Secure and Maintainable Code

Follow best practices such as:

- Proper error handling
- Using bind variables to prevent SQL injection
- Modular code organization with packages
- Commenting and documentation

### Resources for Learning Oracle PL/SQL

- Official Documentation: Oracle's PL/SQL Language Reference
- Books: "Oracle PL/SQL Programming" by Steven Feuerstein
- Online Tutorials: Websites like Oracle Learning Library, TutorialsPoint, and Udemy courses
- Community Forums: Oracle Community, Stack Overflow

### Practical Tips for Mastering Oracle PL/SQL

- Practice consistently by writing small projects.
- Analyze and optimize existing code.
- Collaborate with peers and participate in forums.
- Stay updated with the latest features and best practices.
- Work on real-world scenarios, such as data validation, reporting, and 4 automation tasks.

### Conclusion

Learning Oracle PL/SQL opens up a world of possibilities for managing and manipulating data within Oracle databases effectively. By understanding its core concepts, practicing regularly, and leveraging available resources, you can develop robust, efficient, and secure database applications. Whether you aim to become a database developer, administrator, or analyst, mastering PL/SQL is a strategic investment in your professional growth.

### QuestionAnswer

What are the key concepts I should understand when starting to learn Oracle PL/SQL? Begin with understanding PL/SQL blocks, variables, data types, control structures (IF, LOOP), cursors, exception handling, and stored procedures/functions. Familiarity with SQL is essential since PL/SQL extends SQL with procedural capabilities.

How can I improve my efficiency in writing PL/SQL code for Oracle databases? Practice writing modular code using procedures and functions, leverage cursors efficiently, use bind variables to optimize performance, and utilize Oracle's built-in debugging tools. Studying execution plans and understanding PL/SQL optimization techniques also helps.

What are some common challenges faced when learning Oracle PL/SQL, and how can I overcome them? Common challenges include understanding complex cursor management, debugging code, and optimizing performance. Overcome these by practicing with real-world scenarios, studying Oracle documentation, joining online communities, and working on projects to gain hands-on experience.

Which resources are best for learning Oracle PL/SQL effectively? Recommended resources include Oracle's official documentation, online courses on platforms like Udemy and Coursera, tutorials on websites like Oracle Dev Gym, community forums like Stack Overflow, and books such as "Oracle PL/SQL Programming" by Steven Feuerstein.

How does learning Oracle PL/SQL benefit my career as a database developer or administrator? Mastering

Oracle PL/SQL enables you to write efficient stored procedures, automate database tasks, improve application performance, and contribute to secure and maintainable database solutions. It enhances your value as a developer or administrator working with Oracle databases. Learning Oracle PL/SQL is an essential step for developers, database administrators, and data enthusiasts aiming to harness the full power of Oracle Database. As a robust procedural extension to SQL, Oracle PL/SQL offers a rich set of features that enable complex data manipulation, automation, and the creation of scalable, high-performance applications within the Oracle ecosystem. Whether you're starting from scratch or looking to deepen your existing knowledge, understanding learning Oracle PL/SQL can open doors Learning Oracle PL SQL 5 to advanced database programming and optimization.

--- Introduction to Oracle PL/SQL PL/SQL (Procedural Language/Structured Query Language) is Oracle Corporation's proprietary extension to SQL. It combines the data manipulation capabilities of SQL with the procedural programming features of languages like Ada, Pascal, or C. This integration allows developers to write sophisticated scripts, stored procedures, triggers, functions, and packages that execute directly within the Oracle Database environment.

Why is Learning Oracle PL/SQL Important?

- Enhanced Performance: PL/SQL allows for batch processing and reduces network traffic by executing multiple SQL statements as a single block.
- Code Reusability: Through procedures, functions, and packages, code can be modularized and reused across different applications.
- Automation and Business Logic: Implement complex business rules directly in the database layer, ensuring data integrity and consistency.
- Integration with Oracle Tools: Works seamlessly with Oracle SQL Developer, TOAD, and other Oracle tools for development, testing, and deployment.

--- Getting Started with Oracle PL/SQL Before diving into coding, ensure you have the necessary environment:

- Oracle Database: Install Oracle Database Express Edition (XE) or any other edition suitable for your needs.
- Development Tools: Use Oracle SQL Developer, TOAD, or command-line interfaces like SQLPlus.
- Basic SQL Knowledge: Familiarity with SQL syntax, DDL, DML, and querying is essential.

Setting Up Your Environment

1. Install Oracle Database and create a user schema.
2. Configure your preferred IDE or command-line tool.
3. Connect to the database with your user credentials.

--- Core Concepts of Oracle PL/SQL To effectively learn Oracle PL/SQL, understanding its fundamental concepts is crucial. Blocks PL/SQL code is organized into blocks, which are the basic units of code execution. A block can be anonymous or named (stored procedures, functions, packages).

Basic structure of a PL/SQL block:

```

``sql DECLARE -- Variable declarations
BEGIN -- Executable statements
EXCEPTION -- Exception handling
END;

```

Variables and Data Types Variables are used to store data within blocks. Common data types include:

- NUMBER
- VARCHAR2
- DATE
- BOOLEAN

Control Structures PL/SQL supports:

- IF-THEN- ELSE
- CASE statements
- LOOPS (FOR, WHILE)
- EXIT and CONTINUE

Cursors Cursors enable row-by-row processing of query results, essential for handling complex data operations.

Exception Handling Robust error management is vital. PL/SQL provides predefined exceptions and allows for custom exception handling.

--- Learning Path for Oracle PL/SQL

1. Master Basic Syntax and Data Types Start with understanding how to declare variables, write simple anonymous blocks, and execute basic SQL statements within PL/SQL.
2. Practice Control Structures and Loops Write scripts that utilize IF conditions, loops, and case statements to control flow and perform iterative tasks.
3. Work with Cursors and Collections Learn to process query results efficiently using cursors and handle complex data sets with collections like nested tables and VARRAYs.
4. Develop Functions and Procedures Create reusable procedures and functions to encapsulate logic, improve

modularity, and promote code reuse. 5. Build Packages Group related Learning Oracle PL SQL 6 procedures, functions, and variables into packages for better manageability. 6. Implement Exception Handling Write robust code by anticipating and managing potential errors and exceptions. 7. Optimize Performance Understand PL/SQL optimization techniques such as bulk processing, minimizing context switches, and using proper indexing. --- Practical Tips for Learning Oracle PL/SQL - Practice Regularly: Building real-world scripts and programs enhances understanding. - Use Sample Databases: Oracle provides sample schemas like HR or SCOTT for practice. - Read Official Documentation: Oracle's official docs are comprehensive and authoritative. - Join Community Forums: Engage with communities like Oracle Forums, Stack Overflow, or Reddit for support. - Attend Training and Tutorials: Enroll in online courses or workshops for structured learning. --- Common Use Cases for Oracle PL/SQL - Stored Procedures and Functions: Automate repetitive tasks and encapsulate business logic. - Triggers: Implement automatic actions on data modifications. - Bulk Data Processing: Handle large datasets efficiently with bulk collect and forall statements. - Data Validation: Enforce data integrity rules directly within the database. - Reporting and Data Transformation: Prepare data for reports or data warehouses. --- Advanced Topics in Oracle PL/SQL Once comfortable with basics, explore: - Dynamic SQL: Execute SQL statements constructed at runtime. - Advanced Performance Tuning: Analyze and optimize PL/SQL code. - Database Security: Implement security best practices within PL/SQL code. - Distributed Transactions: Manage transactions across multiple databases. - Integration with Java and External Languages: Extend PL/SQL capabilities. --- Resources for Learning Oracle PL/SQL - Official Oracle Documentation: [<https://docs.oracle.com/en/database/oracle/oracle-database/>](<https://docs.oracle.com/en/database/oracle/oracle-database/>) - Books: "Oracle PL/SQL Programming" by Steven Feuerstein, "Oracle PL/SQL Best Practices" - Online Courses: Coursera, Udemy, LinkedIn Learning - Practice Platforms: SQLZoo, LeetCode (for SQL challenges), Oracle Live SQL --- Conclusion: Your Journey to Mastery Learning Oracle PL/SQL is a rewarding pursuit that combines the power of SQL with procedural programming. It enables you to perform complex data operations, automate tasks, and create scalable applications within the Oracle environment. The key to mastering PL/SQL lies in consistent practice, exploring real-world scenarios, and leveraging available resources. As you progress, you'll unlock advanced features that allow you to optimize performance, enhance security, and develop sophisticated database solutions. Embrace the learning journey, and you'll become proficient in Oracle PL/SQL, positioning yourself as a valuable asset in enterprise database management and development. Oracle PL SQL, PL SQL tutorial, Oracle database, PL SQL programming, Oracle SQL developer, PL SQL functions, Oracle stored procedures, PL SQL scripts, Oracle database administration, PL SQL best practices

Oracle PL/SQL Programming Oracle Web Application Programming for PL/SQL Developers Advanced Oracle PL/SQL Oracle PL/SQL Language Pocket Reference Mastering Oracle PL/SQL Easy Oracle PL/SQL Oracle PL/SQL Language Oracle 8 PL/SQL Programming Learning Oracle PL/SQL Oracle PL/SQL Programming In Simple Steps Oracle PL / SQL For Dummies Beginning Oracle PL/SQL Oracle PL/SQL Programming Fundamentals Oracle PL/SQL by Example Oracle PL/SQL Programming: A Developer's Workbook Oracle PL/SQL Programming Oracle Database 10g PL/SQL Programming Oracle PL/SQL Programming Oracle PL/SQL Best Practices Sql, PL/Sql - The Prog. Language Of Oracle - 3Rd Rev. Edn. Steven Feuerstein Susan Boardman Steven Feuerstein Steven Feuerstein

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the authors have revised and updated this bestseller to include both the oracle8i and new oracle9i internet savvy database products

learn to use oracle 9i to build dynamic data driven sites get step by step details on creating and deploying applications using pl sql html java xml wml perl and php this book covers everything users need to know to master application development in an oracle environment using pl sql

this book expands on the techniques provided in oracle pl sql programming taking readers deep into the world of pl sql packages the book provides much more than advice and examples it comes with a disk containing a full use shareware version of pl vision a library of dozens of packages written by the author these packages greatly accelerate the development of pl sql based applications

annotation this pocket reference condenses the most vital information from oracle pl sql programming into an accessible quick reference that summarises the basics of pl sql block structure fundamental language elements data structures control statements and use of procedures functions and packages

do you need more from a pl sql book than just the correct keywords and some pretty syntax diagrams have you been searching in vain for real world examples and genuine strategies for maximizing the benefits of pl sql within your organization you'll find them here in mastering oracle pl sql practical solutions the inaugural title of the pioneering oaktable press series from apress this isn't a tutorial on how to code pl sql it's designed to show you how to code pl sql well it shows you how to write code that will run quickly and won't break in high load multiuser environments it covers the vast array of the functionality that pl sql provides including effective handling of relational and abstract data security triggers dynamic web content presentation from within the database creation of a dba toolkit and effective debugging techniques this book sets out to redress the unjust criticism leveled at pl sql in years gone by it gives you the tools and techniques to ensure that whatever your needs are the pl sql you build will run as efficiently as possible the practical solutions provided in this book will help you to realize the true power and functionality pl sql can offer

your projects if you're brand new to PL SQL then you'll want to take some time to get familiar with the language before tackling this book. It's not for the total beginner but once you're up and running you'll find this book an invaluable guide for ensuring that the PL SQL solutions you build are robust, perform well, and are easy to maintain.

provides instructions on how to create, debug, and execute PL SQL code.

This updated edition describes features available in Oracle 9i and provides a quick reference that summarizes PL SQL syntax for every developer who uses PL SQL for database programming.

Designed for both the novice programmer as well as the experienced systems engineer, this text seeks to show the reader how to develop, test, debug, and tune Oracle applications using Visual Basic, SQL\*Plus, and Developer 2000. New features such as LOBs and ADTs are integrated throughout the book. It also includes common business problems and their solutions using PL SQL, using real-world examples where applicable.

Learning Oracle PL SQL introduces PL SQL in a way that's useful to a variety of audiences: beginning programmers, new Oracle database administrators, and developers familiar with other databases who now need to learn Oracle. A consistent and understandable example application, the development of a library's electronic catalog system, runs through the chapters.

This book effectively explains the concept of PL SQL programming. It gives a short yet complete description of the PL SQL programming concepts and explains them step by step. This book provides core information that every PL SQL developer should know to write PL SQL programs that interact with Oracle databases, perform complex calculations, and handle exceptions. Loaded with lots of examples and illustrations to explain concepts, this book would help you learn PL SQL programming with minimal effort.

Find tips for creating efficient PL SQL code. If you know a bit about SQL, this book will make PL SQL programming painless. The Oracle has spoken: you need to get up to speed on PL SQL programming. Right? We predict it'll be a breeze with this book. You'll find out about code structures, best practices, and code naming standards. How to use conditions and loops. Where to place PL SQL code in system projects. Ways to manipulate data and more. Discover how to write efficient, easy-to-maintain code. Test and debug PL SQL routines. Integrate SQL and PL SQL. Apply PL SQL best practices. Use new features introduced in Oracle 9i and 10g.

Beginning Oracle PL SQL gets you started in using the built-in language that every Oracle developer and database administrator must know. Oracle database is chock-full of built-in application features that are free for the using, and PL SQL is your ticket to learning about and using those features from your own code. With it, you can centralize business logic in the database, you can offload application logic, and you can automate database and application administration tasks. Author Don Bales provides in Beginning Oracle PL SQL a fast-paced and example-filled tutorial. Learn from Don's extensive experience to discover the most commonly used aspects of PL SQL without wasting time on obscure and obsolete features. The author takes his 20 years of experience and a wealth of statistics he's gathered on PL SQL usage over those years and applies the 80/20 rule: cover what's most needed and used by PL SQL professionals and avoid what's not necessary. The result is a book that covers all the key

features of pl sql without wasting your time discussing esoteric and obsolete parts of the language learn what really matters so that you can get to work feeling confident with what you know about pl sql covers the key topics that matter including variables and datatypes executing statements working with cursors bulk operations real world objects debugging testing and more teaches you to write production level object oriented pl sql you ll explore relational pl sql but unlike most other books on the subject this one emphasizes the use of pl sqls object oriented features as well guides you in working through real examples of using of pl sql you ll learn pl sql by applying it to real world business problems not by heavy theory

pl sql is the oracle procedural language extension of sql pl sql is integrated within the oracle database a pl sql program can have both sql statements and procedural statements in the program the sql statements are used to access sets of data stored in a database while the procedural statements are used to process individual piece of data and control the program flow by applying for example the pl sql s if then else and looping structures this book oracle pl sql programming fundamentals by examples is for pl sql beginners if you have no prior or limited skill of pl sql and you want to learn the oracle pl sql programming language the practical way then this book is perfect for you when you finish reading the book and trying its examples you would have equipped yourself with pl sql fundamental skills to start writing some pl sql programs for a real world development project source codes listing of the examples are included in the appendix of the book

using pl sql for oracle database 21c you can build solutions that deliver unprecedented performance and efficiency in any environment including the cloud oracle pl sql by example sixth edition teaches all the pl sql skills you ll need through real world labs and extensive examples now fully updated for the newest version of pl sql 21c it covers everything from basic syntax and program control through the latest optimization and tuning enhancements step by step you ll walk through every key task mastering today s most valuable oracle 21c pl sql programming techniques on your own start by downloading the supporting schema and exercises from [informit.com](http://informit.com) title 9780138062835 once you ve done an exercise the author doesn t just present the answer she offers an in depth discussion introducing deeper insights and modern best practices this book s approach fully reflects the author s award winning experience teaching pl sql to professionals at columbia university in new york city new database developers and dbas can use it to get productive fast experienced pl sql programmers will find it to be a superb oracle database 21c solutions reference new in this edition updated code examples throughout new iteration controls for the for loop statement such as stepped range multiple iterations collection and cursor iterations enhancements for pl sql qualified expressions performance enhancements for pl sql functions such as sql macro and better control of the result cache other topics covered mastering basic pl sql concepts and language fundamentals and understanding sql s role in pl sql using conditional and iterative program controls efficiently handling errors and exceptions working with cursors and triggers including compound triggers using stored procedures functions and packages to write modular code that other programs can run working with collections object relational features native dynamic sql bulk sql and other advanced features

written by one of the world s leading experts on the oracle pl sql language this text offers extensive exercises in all skill levels covering major features of the language also provides a primer to the pl sql language

considered the best oracle pl sql programming guide by the oracle community this definitive guide is precisely what you need to make the most of oracle s powerful procedural language the sixth edition describes the features and capabilities of pl sql up through oracle database 12c release 1 hundreds of thousands of pl sql developers have benefited from this book over the last twenty years this edition continues that tradition with extensive code examples and a lively sense of humor this book explains language fundamentals explores advanced coding techniques and offers best practices to help you solve real world problems get pl sql programs up and running quickly with clear instructions for executing tracing testing debugging and managing code understand new 12.1 features including the accessible by clause with function and udf pragma bequeath current user for views and new conditional compilation directives take advantage of extensive code samples from easy to follow examples to reusable packaged utilities optimize pl sql performance with features like the function result cache and oracle utilities such as pl scope and the pl sql hierarchical profiler build modular easy to maintain pl sql applications using packages procedures functions and triggers

create dynamic client server applications using pl sql and the comprehensive information contained in this authoritative volume expert oracle insiders cover the features of pl sql explain scripting semantics and syntax and fully detail the pl sql functionality of oracle database 10g you ll learn how to write powerful pl sql programs interact with oracle databases perform complex calculations and handle error conditions

this guide is designed to bring you up to speed as quickly as possible on the new pl sql features of oracle8i it covers autonomous transactions invoker rights new built in packages and much more

in this book steven feuerstein widely recognized as one of the world s experts on the oracle pl sql language distills his many years of programming writing and teaching about pl sql into a set of pl sql language best practices rules for writing code that is readable maintainable and efficient too often developers focus on simply writing programs that run without errors and ignore the impact of poorly written code upon both system performance and their ability and their colleagues ability to maintain that code over time oracle pl sql best practices is a concise easy to use reference to feuerstein s recommendations for excellent pl sql coding it answers the kinds of questions pl sql developers most frequently ask about their code how should i format my code what naming conventions if any should i use how can i write my packages so they can be more easily maintained what is the most efficient way to query information from the database how can i get all the developers on my team to handle errors the same way the book contains 120 best practices divided by topic area it s full of advice on the program development process coding style writing sql in pl sql data structures control structures exception handling program and package construction and built in packages it also contains a handy pull out quick reference card as a helpful supplement to the text code examples demonstrating each of the best practices are available on the o reilly web site oracle pl sql best practices is intended as a companion to o reilly s larger oracle pl sql books it s a compact readable reference that you ll turn to again and again a book that no serious developer can afford to be without

oracle s workgroup or enterprise server are the world s largest selling rdbms products it is estimated that the combined sales of both these oracle products account for more than 80

of rdbms products it is estimated that the combines sales of both these oracle products account for more than 80 of rdbms engines sold worldwide a very large amount of commercial applications are developed around these products most erp software such as sap r3 avalon marshall peoplesoft oracle applications and a host of other such client software work with the oracle rdbms engine worldwide whether a corporate entity chooses to use oracle work group of enterprise server the natural programming language of both of these products in ansi sql and pl sql this book has been written to address the need of programmers who wish to have a ready reference book with examples which covers ansi sql and pl sql the creating of user defined functions procedures database triggers and other specific data processing pl sql code blocks for commercial applications will always required programmers who can code comfortably in ansi sql and pl sql exception handling oracle s default locking and user defined locking has been covered in a fair amount of detail however these areas are of great interest to commercial application developers programmers with these explicit skills will always find employment in that segment of the software industry which develops commercial applications i have tried to use my extensive commercial application development experience in oracle using ansi sql and pl sql to produce a book that has answers to most of the questions that seem to puzzle programmers in ansi sql and pl sql every single programming question has not been answered indeed if i tried to actually do that i would fail since i believe that i myself have not encountered every single programming problem however i ve chosen several key areas in commercial applications and tried to address a set of issues that most commercial applications developers require concepts are built using simple language examples have easily understood logic once this is grasped the skill gained must allow any commercial application developer to develop programs in ansi sql and pl sql very very quickly

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Introduction

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