

ENGINEERING MECHANICS STATIC BY MARIAM PDF

Engineering Mechanics Static by Mariam: A Comprehensive Guide to Understanding Equilibrium and Structural Analysis

Engineering Mechanics Static by Mariam is a foundational textbook that has gained widespread recognition among engineering students and professionals alike. This book offers an in-depth exploration of the principles governing static forces and moments, providing readers with the essential tools needed to analyze and design stable structures. Whether you are a beginner just starting your journey in engineering or an experienced engineer seeking a refresher, this book serves as an invaluable resource that combines theoretical concepts with practical applications.

In this article, we will delve into the core topics covered in Engineering Mechanics Static by Mariam, explore key concepts such as equilibrium, free-body diagrams, and force systems, and provide tips on how to effectively utilize this book for your studies or professional work.

Overview of Engineering Mechanics Static by Mariam

Engineering Mechanics Static by Mariam is designed to introduce students to the fundamental principles of mechanics that govern stationary objects and structures. The book emphasizes a clear understanding of the behavior of forces and moments acting on bodies at rest, laying the groundwork for advanced structural analysis and design.

Some of the notable features of the book include:

- Comprehensive coverage of core static principles
- Clear, step-by-step explanations
- Numerous illustrative examples and diagrams
- End-of-chapter problems for practice
- Real-world applications and case studies

This detailed approach ensures that readers can grasp both the theoretical foundations and practical applications of static mechanics.

Core Topics Covered in Engineering Mechanics Static by Mariam

The book systematically covers a wide range of topics essential for mastering static mechanics. Here are some of the primary areas:

1. Introduction to Statics

- Definition and scope of static mechanics
- Importance of statics in engineering design
- Basic concepts of force, moment, and equilibrium

2. Force Systems

- Types of forces (concurrent, non-concurrent)
- Force vectors and their properties
- Resultant of force systems
- Equilibrium of force systems

3. Equilibrium of Bodies

- Conditions for equilibrium
- Free-body diagrams
- Equilibrium equations in two and three dimensions

4. Structural Analysis

- Trusses and frameworks
- Method of joints
- Method of sections
- Frames and machines

5. Centroids and Center of Gravity

- Centroid of composite areas
- Center of gravity of bodies
- Applications in structural stability

6. Moments of Inertia

- Moment of inertia for areas
- Parallel axis theorem
- Radius of gyration

7. Friction

- Laws of friction
- Applications in inclined planes and pulleys
- Belt friction and friction in machines

Fundamental Concepts in Engineering Mechanics Static by Mariam

Understanding the fundamental concepts is crucial for mastering static mechanics. Mariam's book emphasizes these core ideas with clarity and precision.

Equilibrium of Bodies

- An object is in static equilibrium if it is at rest or moving with constant velocity.
- The sum of all forces and moments acting on the body must be zero:
- $\sum F = 0$ (Sum of forces)
- $\sum M = 0$ (Sum of moments)

Free-Body Diagrams (FBDs)

- Visual representation of all external forces and moments acting on a body
- Essential for analyzing complex structures
- Helps in applying equilibrium equations accurately

Force and Moment Systems

- Understanding different types of force systems
- Converting complex force arrangements into simpler equivalent systems
- Resultant forces and moments

Applying the Principles: Step-by-Step Approach

Mariam's book guides students through a systematic process for analyzing static problems:

- Identify the problem and determine what is given and what is to be found.
- Draw the free-body diagram (FBD), clearly depicting all forces and moments.
- Apply equilibrium equations to the FBD:
 - Sum of forces in horizontal and vertical directions
 - Sum of moments about a suitable point
- Solve the equations to find unknown forces or reactions.
- Check the results for consistency and physical plausibility.

This step-by-step approach enhances problem-solving skills and promotes a deeper understanding of static principles.

Common Types of Problems and Solutions in Engineering Mechanics Static

Mariam's book provides a variety of practice problems to reinforce learning. Some typical problem types include:

- Support reactions in beams: Calculating reactions at supports using equilibrium equations.
- Truss analysis: Determining member forces using the method of joints and sections.
- Force system simplification: Reducing complex force arrangements into equivalent simpler systems.
- Center of gravity and centroid calculations: Finding the centroid of composite shapes.
- Friction problems: Analyzing inclined planes, pulleys, and belt drives.

Each problem type is accompanied by detailed solutions, illustrating the application of concepts step-by-step.

Tips for Using Engineering Mechanics Static by Mariam Effectively

To maximize the benefits of this textbook, consider the following strategies:

- Thoroughly study the examples: They illustrate how to approach and solve different types of problems.
- Practice regularly: Solve end-of-chapter problems to reinforce understanding.
- Create summary notes: Summarize key concepts, formulas, and steps for quick revision.

- Use diagrams effectively: Develop the habit of drawing clear and accurate free-body diagrams.
- Seek additional resources: Supplement your learning with online tutorials, videos, and discussion groups.
- Review mistakes: Analyze errors carefully to avoid repeating them in future problems.

How Engineering Mechanics Static by Mariam Supports Engineering Education

This book is particularly beneficial for engineering students because it bridges the gap between theoretical mechanics and real-world applications. It emphasizes:

- Conceptual clarity: Simplifies complex ideas into understandable language.
- Visual learning: Uses numerous diagrams and illustrations.
- Practical relevance: Demonstrates how static principles are applied in designing bridges, buildings, machinery, and other structures.
- Problem-solving skills: Develops analytical thinking through diverse practice exercises.

By integrating theory with practice, Mariam's book prepares students to excel academically and professionally.

Conclusion: Mastering Static Mechanics with Mariam's Book

Engineering Mechanics Static by Mariam stands out as an essential resource for anyone aspiring to excel in structural analysis and design. Its comprehensive coverage, clear explanations, and practical approach make it an ideal guide for mastering the core concepts of static equilibrium, force systems, and structural analysis.

Whether used for self-study, classroom instruction, or professional reference, this book equips readers with the knowledge and skills needed to analyze static systems confidently. By understanding the principles outlined in Mariam's work, students and engineers can contribute to safer, more efficient, and innovative engineering solutions.

Embark on your journey through static mechanics with Mariam's insightful guidance, and build a solid foundation for your engineering career.

Engineering Mechanics Static by Mariam: An In-Depth Review and Analysis

Engineering Mechanics Static by Mariam has emerged as a significant resource for students, educators, and professionals in the field of civil, mechanical, and aerospace engineering. This comprehensive textbook aims to demystify the fundamental principles of statics, a core component

of engineering mechanics, by offering clear explanations, practical examples, and rigorous problem-solving techniques. This article provides a detailed review and critical analysis of the book, exploring its structure, content, pedagogical approach, and its contribution to engineering education.

Introduction to Engineering Mechanics Static by Mariam

Overview and Context

Engineering Mechanics Static by Mariam is designed to serve as a foundational textbook for undergraduate courses in engineering mechanics. The book emphasizes the core concepts of static equilibrium, force analysis, moment calculations, and the behavior of structures under various loads. Mariam's approach integrates theoretical principles with real-world applications, making complex topics accessible and engaging.

The significance of statics in engineering cannot be overstated. It forms the basis for understanding how structures and mechanical systems resist loads without motion. Mariam's work aims to bridge the gap between abstract mathematical formulations and practical engineering problems, thereby enhancing students' problem-solving skills and conceptual understanding.

Structural Organization and Content Breakdown

The book is systematically organized into chapters that progressively build the reader's understanding of static concepts. Each chapter combines theoretical explanations, illustrative examples, and practice problems to reinforce learning.

Part 1: Fundamentals of Statics

This section introduces the basic principles of statics, including force systems, free-body diagrams, and equilibrium conditions. Mariam emphasizes clarity in the presentation of fundamental concepts, ensuring that foundational knowledge is solid before progressing.

- Force Systems: Explanation of point forces, distributed loads, and their representations.
- Free-Body Diagrams (FBDs): Step-by-step guidance on constructing FBDs, which serve as the starting point for analysis.
- Equilibrium Conditions: Derivation and application of the equilibrium equations in two and three dimensions.

Part 2: Analytic Methods of Force and Moment

This section covers the mathematical techniques necessary for solving static problems:

- Two- and Three-Force Members: Understanding the conditions for members to be in equilibrium.
- Vector Methods: Use of vector algebra to analyze complex force systems.
- Moment of Force: Calculations of moments about points and axes, including the principle of moments.

Part 3: Structural Analysis

Here, Mariam explores the analysis of trusses, frames, and beams:

- Method of Joints: A step-by-step approach for analyzing truss members.
- Method of Sections: Efficient technique for determining forces in specific members.
- Beams and Shear Force Diagrams: Analysis of bending moments and shear forces in beams subjected to various loads.

Part 4: Friction and Structural Stability

This section addresses the effects of friction in mechanical systems and the stability of structures:

- Frictional Forces: Coulomb friction, limiting equilibrium, and applications.
- Stability of Equilibrium: Analysis of collinear and concurrent forces, and the stability of structures under load.

Pedagogical Approach and Educational Effectiveness

Mariam's book is distinguished by its student-friendly pedagogical features, which include:

- Clarity of Explanations: Concepts are presented in straightforward language, avoiding unnecessary jargon.
- Illustrations and Diagrams: High-quality diagrams clarify complex ideas and facilitate visual learning.
- Worked Examples: Step-by-step solutions demonstrate problem-solving procedures, encouraging active learning.
- Practice Problems: End-of-chapter exercises with varying difficulty levels reinforce understanding and prepare students for exams.
- Summary and Key Point Sections: Concise summaries help consolidate learning and highlight essential ideas.

This approach ensures that learners not only understand the theoretical aspects but also develop practical skills needed for engineering applications.

Analytical and Critical Perspectives

While Mariam's Engineering Mechanics Static excels in clarity and pedagogical design, critical analysis reveals both strengths and areas for potential enhancement.

Strengths

- Comprehensive Coverage: The book covers all core topics systematically, making it a one-stop resource for static analysis.
- Practical Orientation: Real-world examples bridge theory and practice, fostering applied understanding.
- Accessibility: The language and presentation make complex topics accessible to beginners and intermediate learners.
- Visual Aids: Diagrams and figures significantly aid comprehension, especially for visual learners.

Limitations and Areas for Improvement

- Depth of Theoretical Derivations: Some advanced derivations and proofs are simplified, which might limit deeper theoretical understanding for postgraduate students.
- Integration of Modern Computational Tools: The book largely emphasizes classical analytical methods; integrating software-based analysis (e.g., CAD or finite element methods) could enhance relevance.
- Problem Diversity: While practice problems are adequate, increasing the diversity of real-life scenarios could improve applicability.
- Supplementary Digital Resources: Providing online tutorials, videos, or interactive problem sets could cater to varied learning preferences.

Contribution to Engineering Education

Mariam's Engineering Mechanics Static plays a vital role in shaping foundational engineering skills. Its balanced approach of theory, illustration, and problem-solving equips students with the necessary tools to analyze and design structures confidently.

Furthermore, the book encourages critical thinking and analytical reasoning, which are essential in engineering practice. Its clarity makes it suitable for self-study, and its comprehensive coverage makes it a valuable textbook for classroom instruction.

The emphasis on visual learning aids and step-by-step solutions aligns well with current pedagogical trends favoring active engagement and mastery learning. In addition, the book's structured progression prepares students for more advanced courses such as dynamics, mechanics of materials, and structural analysis.

Conclusion: Overall Impact and Final Assessment

In summation, Engineering Mechanics Static by Mariam is a well-crafted, accessible, and pedagogically sound textbook that effectively introduces core static concepts to engineering students. Its clear explanations, illustrative examples, and practical problems make complex topics approachable and engaging.

While there are opportunities to incorporate modern computational tools and diversify problem sets further, the book's strengths in clarity, coverage, and instructional design make it a valuable resource in engineering education. Mariam's work contributes significantly to building a solid understanding of static equilibrium, serving as both a foundational text and a stepping stone toward more advanced engineering analysis.

For educators and students seeking a reliable, comprehensive guide to engineering mechanics static, Mariam's book stands out as a commendable choice that balances theoretical rigor with practical application. Its ongoing relevance in engineering curricula underscores its importance in shaping the next generation of engineers capable of designing safe, efficient, and innovative structures and systems.

Question What are the fundamental principles covered in 'Engineering Mechanics Static' by Mariam? The book covers core principles such as equilibrium of forces and moments, free body diagrams, centroid and center of gravity, moments of inertia, and analysis of structures under static loads. **Answer** How does Mariam's approach help students understand complex static problems? Mariam employs clear explanations, step-by-step problem-solving techniques, and illustrative diagrams that simplify complex static concepts, making them accessible for students at various levels. Are there any notable features or resources included in the 'Engineering Mechanics Static' by Mariam? Yes, the book includes practice problems, real-world examples, summary notes, and design exercises to reinforce understanding and application of static principles. What makes Mariam's 'Engineering Mechanics Static' a recommended choice for engineering students? Its comprehensive coverage, easy-to-understand language, and practical approach to problem-solving make it a popular choice among students preparing for exams and engineering design projects. Does Mariam's book include recent developments or updated content in static analysis? While primarily focused on fundamental concepts, the latest editions of the book incorporate recent examples and modern methodologies to stay relevant with current engineering practices.

Related keywords: engineering mechanics, static, statics textbook, Mariam, mechanical

equilibrium, forces, free body diagram, structural analysis, Newton's laws, equilibrium equations

MENGISTU HAILE MARIAM GENET AYELE

mengistu haile mariam genet ayele is a name that resonates deeply within Ethiopian history, embodying a complex legacy shaped by decades of political upheaval, leadership challenges, and the nation's quest for stability and development. As a prominent figure in Ethiopia's 20th-century political landscape, Mengistu Haile Mariam's life and career have been subjects of extensive analysis, debate, and reflection. Understanding his background, rise to power, governance style, and subsequent impact on Ethiopia offers valuable insights into the country's turbulent journey through revolution, dictatorship, and eventual transition. This article aims to provide a comprehensive overview of Mengistu Haile Mariam and the significance of his connection to Genet Ayele, a figure often associated with his regime, highlighting their intertwined histories and the broader implications for Ethiopia's political narrative.

Early Life and Background of Mengistu Haile Mariam

Origins and Family Background

Mengistu Haile Mariam was born on May 21, 1937, in the town of Wollega, Ethiopia. His family belonged to the Oromo ethnic group, one of the largest and most influential communities in Ethiopia. Growing up in a rural environment, Mengistu experienced firsthand the struggles faced by Ethiopia's peasantry, which later influenced his political ideology and policies.

Education and Military Career

Mengistu pursued military education at the Ethiopian Military Academy, where he demonstrated exceptional leadership qualities. His military career progressed rapidly, and he became involved in revolutionary activities that aimed to overthrow the imperial regime of Emperor Haile Selassie. His exposure to Marxist and socialist ideologies during this period played a crucial role in shaping his political outlook.

Rise to Power and Political Milestones

The Derg and the Overthrow of Emperor Haile Selassie

In 1974, Mengistu was a key figure in the Derg, a communist military junta that deposed Emperor Haile Selassie after decades of imperial rule. The revolution was driven by economic hardship,

political repression, and widespread dissatisfaction. Mengistu's leadership within the Derg positioned him as a central figure in Ethiopia's new socialist regime.

Ascent to Leadership

Following the death of the Derg's head, Mengistu emerged as the de facto leader of Ethiopia in the late 1970s. His leadership was characterized by the consolidation of power through purges, ideological campaigns, and military strength. He declared himself President of Ethiopia in 1987 and led the country through a period marked by internal conflict, war, and socio-economic reforms.

Governance Style and Policies

Political Repression and Human Rights Violations

Mengistu's regime was notorious for its authoritarian governance, marked by political repression, mass arrests, and executions of perceived opponents. The infamous Red Terror campaign targeted political dissidents and opposition groups, leading to thousands of deaths and widespread fear.

Economic and Social Policies

Under Mengistu, Ethiopia adopted socialist policies, including land redistribution, nationalization of industries, and collectivization efforts. While aimed at reducing inequality, these policies often resulted in economic decline, food shortages, and social unrest.

Military Engagements and Conflicts

Mengistu's leadership saw Ethiopia embroiled in prolonged conflicts, most notably:

- The Eritrean War of Independence, leading to Eritrea's eventual independence in 1993.
- The Ogaden War with Somalia (1977-1978), which was both a military and ideological struggle.

These conflicts drained resources and affected Ethiopia's development trajectory.

Genet Ayele: Connection and Significance

Who is Genet Ayele?

Genet Ayele is a prominent Ethiopian figure known for her association with Mengistu Haile Mariam. She served in various capacities within the regime, often recognized for her loyalty and influence during Mengistu's rule. Her role extended into social and political spheres, making her a notable

personality in Ethiopia's recent history.

The Relationship between Mengistu and Genet Ayele

While details about their personal relationship are limited publicly, Genet Ayele is often described as a close confidante or supporter of Mengistu. She was involved in political activities that aligned with the regime's objectives, and her influence was felt within certain circles of the government.

Impact and Legacy

Genet Ayele's involvement in Ethiopia's political landscape during Mengistu's era reflects the complexities of power dynamics and loyalty within authoritarian regimes. Her story also highlights the role of women in Ethiopian politics, often underrepresented but influential in various capacities.

Downfall, Exile, and Later Life

The Fall of Mengistu

In 1991, Mengistu's regime was overthrown by a coalition of rebel forces, leading to his flight into exile in Zimbabwe. His fall marked the end of one of Ethiopia's most turbulent periods, and the country transitioned towards a new political landscape.

Exile and Asylum

Mengistu has lived in Zimbabwe since 1991, where he was granted asylum. Despite international efforts to bring him to justice for human rights violations, he remains in exile, living a relatively private life.

Current Perspectives and Legal Proceedings

There have been ongoing debates and legal considerations regarding Mengistu's accountability for his regime's actions. Some Ethiopian groups and international bodies continue to call for justice and acknowledgment of the human rights abuses committed during his rule.

Legacy and Ethiopia's Modern Journey

Evaluating Mengistu's Impact

Mengistu Haile Mariam's legacy is multifaceted:

- He is credited by some for attempting to modernize Ethiopia and implement socialist reforms.
- He is equally criticized for authoritarian practices, human rights violations, and economic decline.

Transition to Democracy

Ethiopia has since embarked on a path toward political reform, democratization, and economic development. The lessons learned from Mengistu's era continue to influence contemporary Ethiopian politics, emphasizing the importance of human rights and good governance.

Significance of Historical Reflection

Understanding Mengistu Haile Mariam's role in Ethiopia's history is crucial for appreciating the country's current challenges and aspirations. It serves as a reminder of the delicate balance between revolutionary change and the preservation of human rights.

Conclusion

Mengistu Haile Mariam remains one of Ethiopia's most controversial and studied figures. His leadership period was marked by profound upheavals that shaped the nation's political and social fabric. The association with figures like Genet Ayele underscores the intricate web of relationships and loyalties that defined his regime. As Ethiopia continues to forge its future, reflecting on Mengistu's legacy offers valuable lessons about the perils and potentials of revolutionary leadership, the importance of human rights, and the enduring resilience of the Ethiopian people.

Note: The details about Genet Ayele are limited in public sources, and her association with Mengistu may be based on anecdotal or less-documented accounts. For a comprehensive understanding, further research into credible Ethiopian historical archives or scholarly works is recommended.

Mengistu Haile Mariam Genet Ayele: An In-Depth Investigation into the Life, Legacy, and Controversies of Ethiopia's Former Leader

Introduction

Mengistu Haile Mariam Genet Ayele remains one of the most complex and controversial figures in modern Ethiopian history. As the leader of Ethiopia from 1977 to 1991, Mengistu's tenure was marked by radical socialist reforms, brutal political repression, and profound upheavals that shaped the trajectory of the nation. His legacy continues to evoke fierce debates among historians, political analysts, and Ethiopians themselves. This article aims to provide a comprehensive, investigative overview of Mengistu Haile Mariam Genet Ayele, exploring his early life, rise to power, political ideology, governance style, downfall, and enduring influence.

Early Life and Background

Origins and Family Background

Mengistu Haile Mariam was born on May 21, 1937, in Wollega Province, Ethiopia, to a modest family. His early life was rooted in rural Ethiopia, where he experienced the hardships of peasant life, which arguably informed his later political ideology centered around socialist reforms aimed at addressing rural poverty.

Education and Military Career

Mengistu pursued military training at the Ethiopian Army Academy, eventually rising through the ranks to become a senior officer. His military background was instrumental in his rise to power, particularly after the 1974 Ethiopian Revolution that overthrew Emperor Haile Selassie. His military discipline and strategic acumen positioned him as a key figure in the new revolutionary government.

Rise to Power and Political Ascension

The Derg Regime and the 1974 Revolution

In 1974, a coalition of military officers known as the Derg (or "Committee of the Armed Forces Revolutionary Council") ousted Emperor Haile Selassie, ending centuries of imperial rule. Initially, the Derg was a collective leadership, but Mengistu quickly emerged as a prominent figure due to his organizational skills and ideological commitment.

Consolidation of Power

By 1977, Mengistu had assumed control as the head of the Derg, establishing a Marxist-Leninist one-party state. His consolidation of power involved purging rivals, suppressing dissent, and establishing a centralized command. His leadership was characterized by a ruthless approach to maintaining control, often employing violence and repression against perceived enemies.

Ideology and Policy Framework

Marxist-Leninist Orientation

Mengistu's governance was deeply rooted in Marxist-Leninist ideology, with a focus on land redistribution, nationalization of industries, and the pursuit of socialist ideals. His government aimed to modernize Ethiopia through radical reforms, often at the expense of traditional institutions and social structures.

Land Reform and Economic Policies

A cornerstone of Mengistu's policies was the redistribution of land from feudal landlords to peasants. The Land Reform Proclamation of 1975 aimed to abolish feudal landholding patterns, which were seen as remnants of imperial and aristocratic privilege. Despite initial enthusiasm, these policies faced implementation challenges and often led to economic dislocation.

Education and Propaganda

Mengistu's regime invested heavily in education and propaganda to promote socialist ideals. State-controlled media disseminated revolutionary messages, fostering a cult of personality around Mengistu himself. Schools and youth organizations, such as the EPRP (Ethiopian People's Revolutionary Party), were mobilized to inculcate ideological loyalty.

Governance and Repression

The Red Terror Campaign

One of the darkest chapters of Mengistu's rule was the Red Terror (1977-1978), a brutal campaign against opponents, rival political factions, and perceived enemies. Thousands of suspected dissidents were killed, imprisoned, or tortured. The campaign was characterized by mass executions, forced disappearances, and a climate of fear.

Human Rights Violations

Numerous reports document severe human rights abuses under Mengistu's regime, including:

- Mass executions of political opponents
- Torture and arbitrary detention
- Suppression of religious and cultural groups
- Forced relocations and collective punishments

These actions drew widespread international condemnation and left a lasting scar on Ethiopia's collective memory.

Economic and Social Challenges

Despite ambitious reform efforts, Ethiopia under Mengistu faced signifi

QuestionAnswer Who was Mengistu Haile Mariam and what role did he play in Ethiopia's

history? Mengistu Haile Mariam was a military officer and politician who served as Ethiopia's head of state from 1977 to 1991. He was the leader of the Derg, the communist military junta that overthrew Emperor Haile Selassie, and established a Marxist-Leninist regime during his rule. What is known about Mengistu Haile Mariam's family and personal background? Mengistu Haile Mariam was born in 1937 in Ethiopia. His wife, Genet Ayele, is known to have been involved during his leadership period, though details about his family are relatively private. His background is rooted in military service, and he rose through the ranks to become a prominent political figure. What happened to Mengistu Haile Mariam after he was ousted from power? After being overthrown in 1991, Mengistu Haile Mariam fled Ethiopia and was granted asylum in Zimbabwe. He has lived in exile since then, and his regime was marked by political repression and conflict. Has Mengistu Haile Mariam been involved in any legal proceedings related to his rule? Yes, Mengistu Haile Mariam was sentenced to death in absentia by an Ethiopian court in 2007 for his role in the Red Terror and other human rights abuses. However, he remains in exile, and there has been no extradition. What is the current public perception of Mengistu Haile Mariam in Ethiopia? Public perception of Mengistu varies; some view him as a leader responsible for political repression and human rights violations, while others remember his era as a time of socialist progress. The legacy remains controversial and widely debated in Ethiopia. What is the significance of Genet Ayele in the context of Mengistu Haile Mariam's life? Genet Ayele is known as the wife of Mengistu Haile Mariam. While she is less publicly prominent than her husband, her association with him makes her a notable figure in discussions about his personal life and the political history of Ethiopia.

Related keywords: Mengistu Haile Mariam, Genet Ayele, Ethiopian history, Derg regime, Ethiopian politics, Ethiopian leaders, Ethiopian revolution, Haile Selassie, Ethiopian military, Ethiopian socialism

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