

Check Engine Trouble Codes

Haynes Techbook series gives the home mechanics an in-depth look at specific areas of auto repair. Each manual offers easy-to-follow text plus hundreds of hands-on photos.

The principles of tuning OBDII vehicles are outlined for do-it-yourself novices and repair professional alike in this introduction to automotive electronic diagnostics. Beginning with basic automotive concepts of engine operation and the powertrain control module, topics span the history of OBDII, anatomy of the scan tool and its components, and the language and protocols that the OBDII uses to communicate faults. Diagnostic tips and detailed fault code descriptions for major domestic automobile manufacturers including General Motors, Ford, and Daimler-Chrysler accompany tips for Asian and European vehicles. The straightforward prose and cooking recipes listed at the end contribute to this comprehensive primer to electronic diagnostics.

AUTOMOTIVE ENGINE DIAGNOSTICS, REPAIRS AND MANAGEMENT TECHNOLOGY:

The Automobile Engine is the power house of the vehicle; it is responsible for supplying power to every system and component in the vehicle. Proper understanding of its operations is necessary for every mechanic and users. The diagnosis of automobile engines related fault is one of the most difficult and complex job to the automobile mechanic or technician, many make wrong guesses or mistakes. This study is to help eliminate such difficulty faced by auto techs and mechanics.

CONTENT:1.AUTOMOBILE ENGINE: DIAGNOSTICS, MANAGEMENT AND REPAIR TECHNOLOGY.2.A CONVERSATION BETWEEN THE AUTO CONSULTANT AND A MECHANIC.3.SOME CLASSIFICATIONS OF AUTOMOBILE ENGINES.4.COMPONENTS

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AND SYSTEMS ASSOCIATED WITH THE ENGINE.5.COMPONENTS AND SYSTEMS THAT CONTROLS ENGINE PERFORMANCE.6.IGNITION SYSTEM.7.FUEL SYSTEM.8.ECU.9.COOLING SYSTEM.10.EXHAUST SYSTEM.11.ENGINE ELECTRICALS.12.CRANKING OF THE ENGINE.13.WORKING PRINCIPLE OF THE ENGINE.14.LUBRICATION. 15.THE POWERTRAIN.16.TRANSMISSION.17.TYPE OF TRANSMISSION. 18.FAULTS ASSOCIATED WITH THE TRANSMISSION SYSTEM.19.THE ECU AND TRANSMISSION.20.AUTOMOTIVE COMPUTERIZED AND ELECTRICAL DIAGNOSTICS.21.TIPS FOR DIAGNOSING ENGINE RELATED PROBLEMS.22.HOW TO PROLONG YOUR CAR ENGINE LIFE. 23.CHECK ENGINE LIGHT.24.CODE READERS AND DIAGNOSTIC SCANNERS.25.WARNING LIGHTS.26.AUTOMOBILE DIAGNOSTIC TECHNOLOGY IN AFRICA. 27.IMPORTANCE OF EVENT HISTORY IN AUTOMOBILE DIAGNOSTICS TECHNOLOGY. 28.IMPORTANCE OF REGULAR DIAGNOSTICS OPERATION.29.MECHATRONICS IN AUTOMOBILE DIAGNOSTICS TECHNOLOGY.30.ENGINE COMPUTERISED DIAGNOSTICS.31.HOW TO USE A DIAGNOSTIC TOOL/SOFTWARE.32.STEP BY STEP DIAGNOSTIC PROCEDURE.33.POWERTRAIN CONTROL MODULE (PCM).34.GENERIC DIAGNOSTIC TROUBLE CODES (DTC).35.QUIZ.36.GENERIC DIAGNOSTIC TROUBLE CODE (DTC) AND DESCRIPTIONS.

Modern cars are more computerized than ever. Infotainment and navigation systems, Wi-Fi, automatic software updates, and other innovations aim to make driving more convenient. But vehicle technologies haven't kept pace with today's more hostile security environment, leaving millions vulnerable to attack. The Car Hacker's Handbook will give you a deeper

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understanding of the computer systems and embedded software in modern vehicles. It begins by examining vulnerabilities and providing detailed explanations of communications over the CAN bus and between devices and systems. Then, once you have an understanding of a vehicle's communication network, you'll learn how to intercept data and perform specific hacks to track vehicles, unlock doors, glitch engines, flood communication, and more. With a focus on low-cost, open source hacking tools such as Metasploit, Wireshark, Kayak, can-utils, and ChipWhisperer, *The Car Hacker's Handbook* will show you how to:

- Build an accurate threat model for your vehicle
- Reverse engineer the CAN bus to fake engine signals
- Exploit vulnerabilities in diagnostic and data-logging systems
- Hack the ECU and other firmware and embedded systems
- Feed exploits through infotainment and vehicle-to-vehicle communication systems
- Override factory settings with performance-tuning techniques
- Build physical and virtual test benches to try out exploits safely

If you're curious about automotive security and have the urge to hack a two-ton computer, make *The Car Hacker's Handbook* your first stop. Keith McCord recounts the history of automotive onboard diagnostic systems and creation of the rudimentary OBD I systems and the development as well as the evolution of OBD II. Currently, OBD-II (OnBoard Diagnostic II) is the standard of the industry, and this book provides a thorough explanation of this system. It details its main features, capabilities, and characteristics. It shows how to access the port connector on the car, the serial data protocols, and what the serial data means. To understand the diagnostic codes, the numbering system is defined and the table of common DTCs is shown. But most importantly, McCord provides a thorough process for trouble shooting problems, tracing a problem to its root, explaining why DTCs may not lead to the source of the underlying problem, and ultimately resolving the

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problem.

Automotive Scan Tool PID Diagnostics (Diagnostics Strategies of Modern Automotive Systems) By Mandy Concepcion In this section, the different techniques of scan tool parameter (PID) analysis will be exposed. Techniques involving PID analysis are quickly catching on, due to their speed and accuracy. By properly analyzing the different scanner PIDs, the technician can arrive at the source of the problem much faster and accurately. These procedures give rise to the new term “driver seat diagnostics”, since most of the preliminary diagnostic work is done through the scanner. However, these techniques will in no way replace the final manual tests that are a part of every diagnostic path. They are simply geared to point the technician in the right direction. Table of Contents INTRODUCTION (Introduction to scan tool diagnostics and the relevance of using PIDs or scanner parameter to perform the first leg of all diagnostics.) - Theory of Operation Behind the Different PIDs (Describes CARB, the difference between generic and enhanced PIDs, the FTP) - OBD II Generic PIDs (PID calculated and actual values, calculated data relationships, base injection timing, ECM value substitution) - OBD I & II General PID analysis (erasing code-or not, recording, analyzing and pinpoint tests, separating PIDs into groups) - Fuel Delivery Fault Detection (fuel delivery issues, intake air temp. sensor, BARO sensor, Engine LOAD, RPM PID, Short-Term Fuel Trims, Long-Term Fuel Trims, 60% of check engine light issues, block learn/integrators, Example 1: injector fault, Example 2: intake gasket issues, fuel status, ignition timing, MAP/MAF, TPS, O2 sensor, IAC, Closed Throttle, injector pulse width, voltage power, injector dutycycle, fuel trim cell) - Test #1 (Determining an engine’s fuel Consumption (rich-lean operation, duty-cycle to fuel trim relationship, O2 sensor to fuel trim relation, FT and vacuum leaks, ignition timing and idle

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control, test conclusion) - Test # 2 (Misfire Detection Strategy, EGR, Ignition and Mechanical misfires) (misfires and OBD2, scanner misfire detection – a time saver, OBD2 40 and 80 cycle misfire, ignition, injector and EGR density misfire, coil-on-plug, misfires and O2 sensor, lean O2 & Secondary misfire, O2 sensor & injector misfires, leaky injector, EGR and the MAP, Type A, B, C misfires, test conclusion) - Test # 3 (Air/Fuel Ratio Faults) (air-fuel imbalance, MAF and post O2 sensors, open-closed-loop, fuel enable, HC & CO relation to AF issues, test conclusion) - Test # 4 (BARO, MAP & MAF PID analysis) (MAP & valve timing faults, ECM behavior, fuel delivery or duty cycle test, volumetric efficiency, , test conclusion) - Test # 5 (Clogged exhaust) (clogged catalytic converter detection, TPS, MAF and converters, idle and WOT or wide open throttle values, vacuum readings, MAP to WOT charts analysis, engine and MAP vacuum, test conclusion) - Test # 6 (EGR Fault Detection) (EGR and MAP values, ECM reaction to EGR issues, EGR temp sensor, DPFE sensor, EGR and O2-MAP and lift position sensor, EGR and engine pre-loading, EGR and the ECM erroneous high LOAD issues, test conclusion) - Test # 7 (O2 Sensor Heater) (O2 heaters and why?, tough to check O2 heater issues, O2 heater effect on signal output, O2 heater bias voltage, engine off and O2 changing value, test conclusion) - Test # 8 (Resetting Fuel Trims) (resetting injection pulse corrections, long-term and short-term fuel trims, learn condition, Lambda, case study on fuel trims, FT resetting according to manufacturer, test conclusion) - Test # 9 (Engine Cranking Vacuum Test) (MAP/MAF cranking vacuum, vacuum to PID analysis, vacuum leaks, gauge-PID test, sources of leaks, cranking values, test conclusion)

Vehicle maintenance.

This book is a printed edition of the Special Issue "Raspberry Pi Technology" that was

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published in Electronics

Advanced Automotive Engine Performance is designed to prepare novice technicians for the challenge of diagnosing today's highly technical electronic engine controls. Using this curriculum, learners will gain familiarity with the operation and variations of emissions systems and associated onboard monitors. The curriculum especially focuses on applying diagnostic strategy to and performing service procedures for emissions systems faults. Learners will also develop an understanding of IM testing and an ability to interpret IM test reports to aid in diagnosis. This objective-based curriculum will prepare learners for the challenges of servicing engine management systems in the shop today. This is a complete curriculum solution for Advanced Automotive Engine Performance. Online courseware is available and is rich in video and animation to support understanding of complex systems. This solution is available in print-plus-digital, or digital-only offerings, providing eBook and online course pairing with mobile-friendly adaptability. Complete tests, tasksheets, and instructor resources make this curriculum easy to adopt and integrate into any automotive program.

Popular Mechanics inspires, instructs and influences readers to help them master the modern world. Whether it's practical DIY home-improvement tips, gadgets and digital technology, information on the newest cars or the latest breakthroughs in science -- PM is the ultimate guide to our high-tech lifestyle.

This manual takes the mystery out of Second-Generation On-Board Diagnostic

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Systems allowing you to understand your vehicles OBD-II sytem, plus what to do when the "Check Engine" light comes on, from reading the code to diagnosing and fixing the problem. Includes a comprehensive list of computer codes. Computer-controlled car repair made easy! For all car and light truck models manufactured since 1996.

Understand your vehicle's On-Board Diagnostic system How to deal with that "Check Engine" light--from reading the code to diagnosing and fixing the problem

Comprehensive computer codes list Diagnostic tools: Powertrain management fundamentals OBD-II "monitors" explained Generic trouble codes that cover all models! Manufacturer-specific trouble codes for GM, Ford, Chrysler, Toyota/Lexus and Honda/Acura vehicles Let your car's computer help you find the problem! Component replacement procedures Glossary and acronym list Fully illustrated with over 250 photographs and drawings

Features detailed instruction in service, troubleshooting, and repair procedures for emission systems, tune-ups, and vacuum diagrams on models built 1984 to 1986

A vital resource for pilots, instructors, and students, from the most trusted source of aeronautic information.

Engine Code ManualChilton's Total Service

Phil Edmonston, Canada's automotive "Dr. Phil," pulls no punches. He says there's never been a better time to buy a new car or truck, thanks to a stronger Canadian dollar and an auto industry offering reduced prices, more cash rebates,

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low financing rates, bargain leases, and free auto maintenance programs. In this all-new guide he says: Audis are beautiful to behold but hell to own (biodegradable transmissions, "rodent snack" wiring, and mind-boggling depreciation Many 2011-12 automobiles have "chin-to-chest head restraints, blinding dash reflections, and dash gauges that can't be seen in sunlight, not to mention painful wind-tunnel roar if the rear windows are opened while underway Ethanol and hybrid fuel-saving claims have more in common with Harry Potter than the Society of Automotive Engineers GM's 2012 Volt electric car is a mixture of hype and hypocrisy from the car company that "killed" its own electric car more than a decade ago You can save \$2,000 by cutting freight fees and "administrative" charges Diesel annual urea fill-up scams can cost you \$300, including an \$80 "handling" charge for \$25 worth of urea Lemon-Aid's 2011-12 Endangered Species List: the Chinese Volvo, the Indian Jaguar and Land Rover, the Mercedes-Benz Smart Car, Mitsubishi, and Suzuki Special edition of the Federal Register, containing a codification of documents of general applicability and future effect ... with ancillaries. "Includes pressure/voltage/current volumes, OBD-2 code definitions & code-setting criteria"--Cover.

From hand-held, dedicated units to software that turns PCs and Palm Pilots into

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powerful diagnostic scanners, auto enthusiasts today have a variety of methods available to make use of on-board diagnostic systems. And not only can they be used to diagnose operational faults, they can be used as low-budget data acquisition systems and dynamometers, so you can maximize your vehicle's performance. Beginning with why scanners are needed to work effectively on modern cars, this book teaches you how to choose the right scanner for your application, how to use the tool, and what each code means. "How To Use Automotive Diagnostic Scanners" is illustrated with photos and diagrams to help you understand OBD-I and OBD-II systems (including CAN) and the scanners that read the information they record. Also included is a comprehensive list of codes and what they mean. From catalytic converters and O2 sensors to emissions and automotive detective work, this is the complete reference for keeping your vehicle EPA-compliant and on the road!

Loaded with over 40 pages of valuable information. Trouble with your car describes information pertaining to problems that can and will occur with any car. It provides information on these parts that cost are relatively inexpensive to purchase and most are easier to replace than most would imagine. It explains why labor may be expensive but need not be if you seek out help at the lowest rate. Always expect to be told how long it should take to replace a part and research all avenues to insure the mechanic is

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quoting you the least amount of time for the lowest rate.

Automotive Engine Performance, published as part of the CDX Master Automotive Technician Series, provides technicians in training with a detailed overview of modern engine technologies and diagnostic strategies. Taking a "strategy-based diagnostic" approach, it helps students master the skills needed to diagnose and resolve customer concerns correctly on the first attempt. Students will gain an understanding of current diagnostic tools and advanced performance systems as they prepare to service the engines of tomorrow.

When it comes to their personal transportation, today's youth have shunned the large, heavy performance cars of their parents' generation and instead embraced what has become known as the "sport compact"--smaller, lightweight, modern sports cars of predominantly Japanese manufacture. These cars respond well to performance modifications due to their light weight and technology-laden, high-revving engines. And by far, the most sought-after and modified cars are the Hondas and Acuras of the mid-'80s to the present. An extremely popular method of improving vehicle performance is a process known as engine swapping. Engine swapping consists of removing a more powerful engine from a better-equipped or more modern vehicle and installing it into your own. It is one of the most efficient and affordable methods of improving your vehicle's performance. This book covers in detail all the most popular performance swaps for Honda Civic, Accord, and Prelude as well as the Acura Integra. It includes

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vital information on electrics, fit, and drivetrain compatibility, design considerations, step-by-step instruction, and costs. This book is must-have for the Honda enthusiast. Carrying on Adrian Streater's tradition of exemplary Porsche 911 technical guides, this book contains everything a 997 owner needs to know, plus a lot more. From engines and transmissions to engine management software – no matter what model of 997, it's all covered here.

Diagnostics, or fault finding, is a fundamental part of an automotive technician's work, and as automotive systems become increasingly complex there is a greater need for good diagnostic skills. *Advanced Automotive Fault Diagnosis* is the only book to treat automotive diagnostics as a science rather than a check-list procedure. Each chapter includes basic principles and examples of a vehicle system followed by the appropriate diagnostic techniques, complete with useful diagrams, flow charts, case studies and self-assessment questions. The book will help new students develop diagnostic skills and help experienced technicians improve even further. This new edition is fully updated to the latest technological developments. Two new chapters have been added – On-board diagnostics and Oscilloscope diagnostics – and the coverage has been matched to the latest curricula of motor vehicle qualifications, including: IMI and C&G Technical Certificates and NVQs; Level 4 diagnostic units; BTEC National and Higher National qualifications from Edexcel; International Motor Vehicle qualifications such as C&G 3905; and ASE certification in the USA.

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The complete manual for understanding engine codes, troubleshooting, basic maintenance and more.

The industry-leading textbook for collision repair and refinishing is now updated to the NATEF 2006 Collision Repair and Refinish Program Standards. Written with clearer explanations and more detail than any other collision repair learning tool on the market, Auto Body Repair Technology, Fifth Edition delves into all aspects of collision repair, from initial collision evaluation, to estimating, to final paint detailing. And because the book is written by a leading author in the auto body field, readers will feel confident that they are learning skills and procedures that incorporate the latest advances in materials and methods. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Air conditioning in vintage cars often falls into disrepair, as owners figure that it never really worked all that well when it was new, and assume that rejuvenation would be prohibitively expensive. In his new book, *Just Needs a Recharge: The Hack Mechanic Guide to Vintage Air Conditioning*, Rob Siegel details exactly what's needed to resurrect long-dead air conditioning in a vintage car, or install a/c in a car that never had it. In a level of detail not found in any other automotive a/c book, Rob reveals what you need to know about flare and o-ring fittings, upgrading to a rotary-style compressor and a parallel-flow condenser, making or specifying custom hoses, and selecting refrigerant so that the a/c blows cold enough to be usable.

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Although the book draws from Rob's BMW experience (with specifics for the BMW 2002 and 3.0CS), and concentrates on vintage a/c systems (those that have flare fittings and originally contained R12), most of the information applies to any air conditioning system, foreign or domestic, vintage or modern. Written in Rob's entertaining Hack Mechanic narrative voice, and including 240 photographs and illustrations, the book covers theory, the choice of refrigerant (R12, R134a, other EPA-approved, non-EPA-approved), legality, tools for a/c work, fittings and sizes, the compressor, the evaporator assembly and expansion valve or orifice tube, the condenser and fan, the receiver/drier or accumulator, electrical connections and compressor cycling, connecting and using manifold gauges, the basic steps for a/c rejuvenation, from-scratch a/c retrofit, making and installing hoses, flushing the system, pressure-testing and leak detection, evacuating and charging the system troubleshooting, and other things that heat up the cabin.

Popular Science gives our readers the information and tools to improve their technology and their world. The core belief that Popular Science and our readers share: The future is going to be better, and science and technology are the driving forces that will help make it better.

AUTOMOTIVE COMPUTERIZED AND ELECTRICAL DIAGNOSTICS TECHNOLOGY is a book that deals with the technology behind computerized and electrical diagnosis of systems and components in the vehicle. This book provides theories of the operations of the On-Board Diagnostic (OBD) protocol; which include the OBD I and OBD II protocol. This book is present a practical approach to automotive diagnostic technology, with step by step analysis. The book also entails the use of various kind of diagnostic tools for various diagnostics operations, the terminology involves in the diagnostic procedure and also the technology behinds it

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operation. The reader step by step procedures of diagnostics operations which is compatible for all kind of diagnostic tool, with necessary advices on how to perform the operations. It also touches all kind of diagnostic tools and diagnostics operation available in the automotive technology industry. This book also cover aspect such as Electronic Control Unit (ECU) reprogramming and repairs, it involves reprogramming of various systems and components in the vehicle. Some key topics in this book involves:

1. AUTOMOTIVE DIAGNOSTICS TECHNOLOGY.
2. THE ON-BOARD DIAGNOSTICS (OBD I) SYSTEM/PROTOCOL.
3. HOW TO DIAGNOSE USING OBD I PROTOCOL.
4. ON-BOARD DIAGNOSTIC (OBD II) SYSTEM/PROTOCOL.
5. DIAGNOSTIC TOOLS/SCANNERS.
6. ELM327.
7. LIMITATIONS OF ELM327.
8. ELECTRONIC CONTROL UNIT (ECU) AND SENSORS.
9. CONTROLLER AREA NETWORK (CAN).
10. CHECK ENGINE LIGHT.
11. CODE READERS VERSUS DIAGNOSTIC SCANNERS.
12. CURRENT AND STORED FAULTS CODES.
13. SOFTWARE/APPLICATIONS FOR DIAGNOSTICS TOOLS.
14. CRACKED SOFTWARE VERSION AND CLONED SCAN TOOLS.
15. IMMOBILIZERS.
16. VIN- VEHICLE IDENTIFICATION NUMBER.
17. SCN- SOFTWARE CALIBRATION NUMBER coding.
18. MULTIPLEXING
19. WARNING LIGHTS.
20. SENSORS AND APPLICATIONS.
21. APPLICATION OF SENSORS IN BRAKING AND STABILITY SYSTEM OF VEHICLES.
22. AUTOMOBILE DIAGNOSTIC TECHNOLOGY IN AFRICA (TAKING NIGERIA AS A CASE STUDY).
23. IMPORTANCE OF EVENT/HISTORY RECORDS IN AUTO DIAGNOSTICS TECHNOLOGY.
24. IMPORTANCE OF REGULAR DIAGNOSTICS OPERATION.
25. MECHATRONICS IN AUTOMOBILE DIAGNOSTICS TECHNOLOGY.
26. ELECTRIC VEHICLES.
27. CLASSIFICATION AND FEATURES OF DIAGNOSTIC

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TOOLS/SCANNERS.28. GENERIC FAULT CODES.29. CHOOSING A DIAGNOSTIC TOOL/SCANNER.30. HOW TO USE A DIAGNOSTIC TOOL/SOFTWARE.31. STEP BY STEP DIAGNOSTIC PROCEDURE.32. REPROGRAMMING OF SYSTEMS AND COMPONENTS IN THE VEHICLE.33. STEPS TO REPROGRAM THE AIRBAG SYSTEM.34. IMMOBILIZER AND ECU REPROGRAMMING.35. PIN GENERATION FOR REPROGRAMMING.36. HOW TO REPROGRAM KEY TO THE IMMOBILIZER AND ECU.37. HOW TO GENERATE PASSCODE OR PIN FROM THE MANUFACTURER OR SERVICE PROVIDER.38. HOW DOES THE IMMOBILIZER SYSTEM WORKS.39. HOW TO DETECT AND DEAL WITH FAULTS IN THE IMMOBILIZER SYSTEM.40. VARIOUS FAULTS IN THE IMMOBILIZER SYSTEM AND SOLUTION.41. LIMITATIONS OF SOME DIAGNOSTIC TOOLS ON SCANNING AND REPROGRAMMING THE IMMOBILIZER SYSTEM.42. HOW TO REPROGRAM THE IMMOBILIZER SYSTEM. 43. HOW TO KNOW AN IMMOBILIZER UNIT IS FAULTY.44. HOW TO KNOW A FAULTY ECU.45. DIAGNOSTIC TOOL/SOFTWARE FOR ECU/IMMOBILIZER REPROGRAMMING.46. ELECTRICAL ERASABLE PROGRAMMABLE READ ONLY MEMORY-EEPROM.47. ECU MAPPING.48. ECU TURNING.49. POWERTRAIN CONTROL MODULE (PCM).50. GENERIC DIAGNOSTIC TROUBLE CODES (DTC).51. GENERIC DIAGNOSTIC TROUBLE CODES (DTC) WITH THEIR DESCRIPTION.

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