# CompTIA IT Fundamentals (ITF+) Certification Exam Objectives

## EXAM NUMBER: FC0-U61

CompTIA

# About the Exam

The CompTIA IT Fundamentals (ITF+) FC0-U61 exam will certify the successful candidate has the knowledge and skills required to identify and explain the basics of:

- **Computing**
- **IT infrastructure**
- **Software development**
- **Database use**

In addition, candidates will demonstrate their knowledge of:

- **Installing software**
- **Establishing basic network connectivity**
- **Identifying/preventing basic security risks**

Further, this exam will assess the candidate's knowledge in the areas of troubleshooting theory and preventive maintenance of devices. This exam is intended for candidates who are advanced end users, considering a career in IT, and interested in pursuing professional-level certifications, such as A+.

Note: This is a pre-professional certification for candidates seeking a career in IT.

## EXAM DEVELOPMENT

CompTIA exams result from subject-matter expert workshops and industry-wide survey results regarding the skills and knowledge required of an entry-level IT professional.

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## PLEASE NOTE

The lists of examples provided in bulleted format are not exhaustive lists. Other examples of technologies, processes or tasks pertaining to each objective may also be included on the exam although not listed or covered in this objectives document. CompTIA is constantly reviewing the content of our exams and updating test questions to be sure our exams are current and the security of the questions is protected. When necessary, we will publish updated exams based on existing exam objectives. Please know that all related exam preparation materials will still be valid.

## TEST DETAILS

| | |
|---|---|
| Required exam | FCO-U61 |
| Number of questions | 75 |
| Type of questions | Multiple choice |
| Length of test | 60 minutes |
| Recommended experience | No prior experience necessary |
| Passing score | 650 (on a scale of 900) |

## EXAM OBJECTIVES (DOMAINS)

The table below lists the domains measured by this examination and the extent to which they are represented.

| DOMAIN | PERCENTAGE OF EXAMINATION |
|---|---|
| 1.0 IT Concepts and Terminology | 17% |
| 2.0 Infrastructure | 22% |
| 3.0 Applications and Software | 18% |
| 4.0 Software Development | 12% |
| 5.0 Database Fundamentals | 11% |
| 6.0 Security | 20% |
| **Total** | **100%** |

# 1.0 IT Concepts and Terminology

## 1.1 Compare and contrast notational systems.

- **Binary**
- **Hexadecimal**
- **Decimal**
- **Data representation**
  - ASCII
  - Unicode

## 1.2 Compare and contrast fundamental data types and their characteristics.

- **Char**
- **Strings**
- **Numbers**
  - Integers
  - Floats
- **Boolean**

## 1.3 Illustrate the basics of computing and processing.

- **Input**
- **Processing**
- **Output**
- **Storage**

## 1.4 Explain the value of data and information.

- **Data and information as assets**
- **Importance of investing in security**
- **Relationship of data to creating information**
- **Intellectual property**
  - Trademarks
  - Copyright
  - Patents
- **Digital products**
- **Data-driven business decisions**
  - Data capture and collection
  - Data correlation
  - Meaningful reporting

## 1.5 Compare and contrast common units of measure.

- **Storage unit**
  - Bit
  - Byte
  - KB
  - MB
  - GB
  - TB
  - PB
- **Throughput unit**
  - bps
  - Kbps
  - Mbps
  - Gbps
  - Tbps
- **Processing speed**
  - MHz
  - GHz

## 1.6 Explain the troubleshooting methodology.

- **Identify the problem**
  - Gather information
  - Duplicate the problem, if possible
  - Question users
  - Identify symptoms
  - Determine if anything has changed
  - Approach multiple problems individually
- **Research knowledge base/ Internet, if applicable**
- **Establish a theory of probable cause**
  - Question the obvious
  - Consider multiple approaches
    - Divide and conquer
- **Test the theory to determine the cause**
  - Once the theory is confirmed (confirmed root cause), determine the next steps to resolve the problem
  - If the theory is not confirmed, establish a new theory or escalate
- **Establish a plan of action to resolve the problem and identify potential effects**
- **Implement the solution or escalate as necessary**
- **Verify full system functionality and, if applicable, implement preventive measures**
- **Document findings/lessons learned, actions, and outcomes**

# 2.0 Infrastructure

## 2.1 Classify common types of input/output device interfaces.

- **Networking**
  - Wired
    - Telephone connector (RJ-11)
    - Ethernet connector (RJ-45)
  - Wireless
    - Bluetooth
    - NFC
- **Peripheral device**
  - USB
  - FireWire
  - Thunderbolt
  - Bluetooth
  - RF
- **Graphic device**
  - VGA
  - HDMI
  - DVI
  - DisplayPort
  - Mini DisplayPort

## 2.2 Given a scenario, set up and install common peripheral devices to a laptop/PC.

- **Devices**
  - Printer
  - Scanner
  - Keyboard
  - Mouse
  - Camera
  - External hard drive
  - Speakers
  - Display
- **Installation types**
  - Plug-and-play vs. driver installation
  - Other required steps
  - IP-based peripherals
  - Web-based configuration steps

## 2.3 Explain the purpose of common internal computing components.

- **Motherboard/system board**
- **Firmware/BIOS**
- **RAM**
- **CPU**
  - ARM
    - Mobile phone
    - Tablet
  - 32-bit
    - Laptop
    - Workstation
    - Server
  - 64-bit
    - Laptop
    - Workstation
    - Server
- **Storage**
  - Hard drive
  - SSD
- **GPU**
- **Cooling**
- **NIC**
  - Wired vs. wireless
  - On-board vs. add-on card

## 2.4 Compare and contrast common Internet service types.

- **Fiber optic**
- **Cable**
- **DSL**
- **Wireless**
  - Radio frequency
  - Satellite
  - Cellular

## 2.5 Compare and contrast storage types.

- **Volatile vs. non-volatile**
- **Local storage types**
  - RAM
  - Hard drive
    - Solid state vs. spinning disk
  - Optical
  - Flash drive
- **Local network storage types**
  - NAS
  - File server
- **Cloud storage service**

## 2.6 Compare and contrast common computing devices and their purposes.

- **Mobile phones**
- **Tablets**
- **Laptops**
- **Workstations**
- **Servers**
- **Gaming consoles**
- **IoT**
  - Home appliances
  - Home automation devices
    - Thermostats
    - Security systems
  - Modern cars
  - IP cameras
  - Streaming media devices
  - Medical devices

## 2.7 Explain basic networking concepts.

- **Basics of network communication**
  - Basics of packet transmission
  - DNS
    - URL-to-IP translation
  - LAN vs. WAN
- **Device addresses**
  - IP address
  - MAC address
- **Basic protocols**
  - HTTP/S
  - POP3
  - IMAP
  - SMTP
- **Devices**
  - Modem
  - Router
  - Switch
  - Access point
  - Firewall

## 2.8 Given a scenario, install, configure and secure a basic wireless network.

- **802.11a/b/g/n/ac**
  - Older vs. newer standards
  - Speed limitations
  - Interference and attenuation factors
- **Best practices**
  - Change SSID
  - Change default password
  - Encrypted vs. unencrypted
    - Open
      - Captive portal
    - WEP
    - WPA
    - WPA2

# 3.0 Applications and Software

## 3.1 Explain the purpose of operating systems.

- **Interface between applications and hardware**
- **Disk management**
- **Process management/scheduling**
  - Kill process/end task
- **Application management**
- **Memory management**
- **Device management**
- **Access control/protection**
- **Types of OS**
  - Mobile device OS
  - Workstation OS
  - Server OS
  - Embedded OS
    - Firmware
  - Hypervisor (Type 1)

## 3.2 Compare and contrast components of an operating system.

- **File systems and features**
  - File systems
    - NTFS
    - FAT32
    - HFS
    - Ext4
- **Features**
  - Compression
  - Encryption
  - Permissions
  - Journaling
  - Limitations
  - Naming rules
- **File management**
  - Folders/directories
  - File types and extensions
  - Permissions
- **Services**
- **Processes**
- **Drivers**
- **Utilities**
  - Task scheduling
- **Interfaces**
  - Console/command line
  - GUI

## 3.3 Explain the purpose and proper use of software.

- **Productivity software**
  - Word processing software
  - Spreadsheet software
  - Presentation software
  - Web browser
  - Visual diagramming software
- **Collaboration software**
  - Email client
  - Conferencing software
  - Instant messaging software
  - Online workspace
  - Document sharing
- **Business software**
  - Database software
  - Project management software
  - Business-specific applications
  - Accounting software

## 3.4 Explain methods of application architecture and delivery models.

- **Application delivery methods**
  - Locally installed
    - Network not required
    - Application exists locally
    - Files saved locally
  - Local network hosted
    - Network required
    - Internet access not required
  - Cloud hosted
    - Internet access required
    - Service required
    - Files saved in the cloud
- **Application architecture models**
  - One tier
  - Two tier
  - Three tier
  - n-tier

## 3.5 Given a scenario, configure and use web browsers.

- **Caching/clearing cache**
- **Deactivate client-side scripting**
- **Browser add-ons/extensions**
  - Add
  - Remove
  - Enable/disable
- **Private browsing**
- **Proxy settings**
- **Certificates**
  - Valid
  - Invalid
- **Popup blockers**
- **Script blockers**
- **Compatible browser for application(s)**

## 3.6 Compare and contrast general application concepts and uses.

- **Single-platform software**
- **Cross-platform software**
  - Compatibility concerns
- **Licensing**
  - Single use
  - Group use/site license
  - Concurrent license
  - Open source vs. proprietary
  - Subscription vs. one-time purchase
  - Product keys and serial numbers
- **Software installation best practices**
  - Reading instructions
  - Reading agreements
  - Advanced options

# 4.0 Software Development Concepts

## 4.1 Compare and contrast programming language categories.

- **Interpreted**
  - Scripting languages
  - Scripted languages
  - Markup languages
- **Compiled programming languages**
- **Query languages**
- **Assembly language**

## 4.2 Given a scenario, use programming organizational techniques and interpret logic.

- **Organizational techniques**
  - Pseudocode concepts
  - Flow-chart concepts
    - Sequence
- **Logic components**
  - Branching
  - Looping

## 4.3 Explain the purpose and use of programming concepts.

- **Identifiers**
  - Variables
  - Constants
- **Containers**
  - Arrays
  - Vectors
- **Functions**
- **Objects**
  - Properties
  - Attributes
  - Methods

# 5.0 Database Fundamentals

## 5.1 Explain database concepts and the purpose of a database.

- **Usage of database**
  - Create
  - Import/input
  - Query
  - Reports
- **Flat file vs. database**
  - Multiple concurrent users
  - Scalability
  - Speed
  - Variety of data
- **Records**
- **Storage**
  - Data persistence

## 5.2 Compare and contrast various database structures.

- **Structured vs. semi-structured vs. non-structured**
- **Relational databases**
  - Schema
  - Tables
    - Rows/records
    - Fields/columns
      - Primary key
      - Foreign key
    - Constraints
- **Non-relational databases**
  - Key/value databases
  - Document databases

## 5.3 Summarize methods used to interface with databases.

- **Relational methods**
  - Data manipulation
    - Select
    - Insert
    - Delete
    - Update
  - Data definition
    - Create
    - Alter
    - Drop
    - Permissions
- **Database access methods**
  - Direct/manual access
  - Programmatic access
  - User interface/utility access
  - Query/report builders
- **Export/import**
  - Database dump
  - Backup

# 6.0 Security

## 6.1 Summarize confidentiality, integrity and availability concerns.

- **Confidentiality concerns**
  - Snooping
  - Eavesdropping
  - Wiretapping
  - Social engineering
  - Dumpster diving
- **Integrity concerns**
  - Man-in-the-middle
  - Replay attack
  - Impersonation
  - Unauthorized information alteration
- **Availability concerns**
  - Denial of service
  - Power outage
  - Hardware failure
  - Destruction
  - Service outage

## 6.2 Explain methods to secure devices and best practices.

- **Securing devices (mobile/workstation)**
  - Antivirus/Anti-malware
  - Host firewall
  - Changing default passwords
  - Enabling passwords
  - Safe browsing practices
  - Patching/updates
- **Device use best practices**
  - Software sources
    - Validating legitimate sources
    - Researching legitimate sources
    - OEM websites vs. third-party websites
  - Removal of unwanted software
  - Removal of unnecessary software
  - Removal of malicious software

## 6.3 Summarize behavioral security concepts.

- **Expectations of privacy when using:**
  - The Internet
    - Social networking sites
    - Email
    - File sharing
    - Instant messaging
  - Mobile applications
  - Desktop software
  - Business software
  - Corporate network
- **Written policies and procedures**
- **Handling of confidential information**
  - Passwords
  - Personal information
  - Customer information
  - Company confidential information

## 6.4 Compare and contrast authentication, authorization, accounting and non-repudiation concepts.

- **Authentication**
  - Single factor
  - Multifactor
  - Examples of factors
    - Password
    - PIN
    - One-time password
    - Software token
    - Hardware token
    - Biometrics
    - Specific location
    - Security questions
  - Single sign-on
- **Authorization**
  - Permissions
  - Least privilege model
  - Role-based access
    - User account types
  - Rule-based access
  - Mandatory access controls
  - Discretionary access controls
- **Accounting**
  - Logs
  - Tracking
  - Web browser history
- **Non-repudiation**
  - Video
  - Biometrics
  - Signature
  - Receipt

## 6.5 Explain password best practices.

- **Password length**
- **Password complexity**
- **Password history**
- **Password expiration**
- **Password reuse across sites**
- **Password managers**
- **Password reset process**

## 6.6 Explain common uses of encryption.

- **Plain text vs. cipher text**
- **Data at rest**
  - File level
  - Disk level
  - Mobile device
- **Data in transit**
  - Email
  - HTTPS
  - VPN
  - Mobile application

## 6.7 Explain business continuity concepts.

- **Fault tolerance**
  - Replication
  - Redundancy
    - Data
    - Network
    - Power
  - Backup considerations
    - Data
      - File backups
      - Critical data
      - Database
      - OS backups
    - Location
      - Stored locally
      - Cloud storage
      - On-site vs. off-site
  - Contingency plan
- **Disaster recovery**
  - Data restoration
  - Prioritization
  - Restoring access

# CompTIA IT Fundamentals (ITF+) Acronyms

The following is a list of acronyms that appear on the CompTIA IT Fundamentals (ITF+) exam. Candidates are encouraged to review the complete list and attain a working knowledge of all listed acronyms as part of a comprehensive exam preparation program.

| ACRONYM | SPELLED OUT |
|---|---|
| AC | Alternating Current |
| ACL | Access Control List |
| AES | Advanced Encryption Standard |
| AIO | All In One |
| APIPA | Automatic Private Internet Protocol Addressing |
| ARM | Advanced RISC Machines |
| ARP | Address Resolution Protocol |
| ASCII | American Standard Code for Information Interchange |
| BD-ROM | Blu-ray Disc-Read-Only Memory |
| BIOS | Basic Input/Output System |
| CAD | Computer-Aided Design |
| CAM | Computer-Aided Manufacturing |
| CD | Compact Disc |
| CD-ROM | Compact Disc-Read-Only Memory |
| CD-RW | Compact Disc-Rewritable |
| CPU | Central Processing Unit |
| CRUD | Create, Read, Update, Delete |
| CSS | Cascading Style Sheets |
| DC | Direct Current |
| DDL | Data Definition Language |
| DDoS | Distributed Denial of Service |
| DDR | Double Data-Rate |
| DHCP | Dynamic Host Configuration Protocol |
| DIMM | Dual Inline Memory Module |
| DLL | Dynamic Link Layer |
| DLP | Data Leak Prevention |
| DML | Data Manipulation Language |
| DNS | Domain Name Service or Domain Name Server |
| DoS | Denial of Service |
| DSL | Digital Subscriber Line |
| DVD | Digital Video Disc or Digital Versatile Disc |
| DVD-R | Digital Video Disc-Recordable |
| DVD-RW | Digital Video Disc-Rewritable |
| DVI | Digital Visual Interface |

| ACRONYM | SPELLED OUT |
|---|---|
| EMI | Electromagnetic Interference |
| eSATA | External Serial Advanced Technology Attachment |
| ESD | Electrostatic Discharge |
| EULA | End-User License Agreement |
| FAT | File Allocation Table |
| FAT32 | 32-bit File Allocation Table |
| FTP | File Transfer Protocol |
| FTPS | File Transfer Protocol over Secure Sockets Layer |
| Gb | Gigabit |
| GB | Gigabyte |
| Gbps | Gigabit per second |
| GHz | Gigahertz |
| GPS | Global Positioning System |
| GPU | Graphics Processing Unit |
| GUI | Graphical User Interface |
| HDD | Hard Disk Drive |
| HDMI | High-Definition Media Interface |
| HFS | Hierarchical File System |
| HTML | Hypertext Markup Language |
| HTTP | Hypertext Transfer Protocol |
| HTTPS | Hypertext Transfer Protocol Secure |
| ICMP | Internet Control Message Protocol |
| IDS | Intrusion Detection System |
| IMAP | Internet Mail Access Protocol |
| IOPS | Input/Output Operations Per Second |
| IoT | Internet of Things |
| IP | Internet Protocol |
| IPS | Intrusion Prevention System |
| IR | Infrared |
| ISP | Internet Service Provider |
| Kb | Kilobit |
| KB | Kilobyte or Knowledge Base |
| Kbps | Kilobit per second |
| LAN | Local Area Network |
| MAC | Media Access Control |

| ACRONYM | SPELLED OUT |
|---|---|
| Mb | Megabit |
| MB | Megabyte |
| Mbps | Megabit per second |
| MHz | Megahertz |
| MITM | Man in the Middle |
| MP3 | Moving Picture Experts Group Layer 3 Audio |
| MP4 | Moving Picture Experts Group Layer 4 |
| NAS | Network Attached Storage |
| NDA | Non-Disclosure Agreement |
| NFC | Near Field Communications |
| NIC | Network Interface Card |
| NTFS | New Technology File System |
| OEM | Original Equipment Manufacturer |
| OS | Operating System |
| PB | Petabyte |
| PC | Personal Computer |
| PCI | Peripheral Component Interconnect |
| PCIe | Peripheral Component Interconnect Express |
| PII | Personally Identifiable Information |
| PIN | Personal Identification Number |
| POP | Post Office Protocol |
| POP3 | Post Office Protocol 3 |
| PSU | Power Supply Unit |
| PXE | Preboot Execution Environment |
| RAID | Redundant Array of Independent Disks |
| RAM | Random Access Memory |
| RF | Radio Frequency |
| RJ | Registered Jack |
| RJ-11 | Registered Jack Function 11 |
| RJ-45 | Registered Jack Function 45 |
| ROM | Read-Only Memory |
| SaaS | Software as a Service |
| SATA | Serial Advanced Technology Attachment |
| SD Card | Secure Digital Card |
| SFTP | Secure File Transfer Protocol |
| SID | System Identifier |
| SMB | Server Message Block |
| SMTP | Simple Mail Transfer Protocol |
| SNMP | Simple Network Management Protocol |
| SOHO | Small Office, Home Office |
| SQL | Structured Query Language |
| SSD | Solid State Drive |
| SSID | Service Set Identifier |
| SSO | Secure Sign-On |
| SSL | Secure Sockets Layer |

| ACRONYM | SPELLED OUT |
|---|---|
| Tb | Terabit |
| TB | Terabyte |
| Tbps | Terabits per second |
| TCP | Transmission Control Protocol |
| TCP/IP | Transmission Control Protocol/Internet Protocol |
| TKIP | Temporal Key Integrity Protocol |
| TLS | Thread Local Storage |
| UPS | Uninterruptable Power Supply |
| URL | Uniform Resource Locator |
| USB | Universal Serial Bus |
| VGA | Video Graphics Array or Video Graphics Adapter |
| VoIP | Voice over Internet Protocol |
| VPN | Virtual Private Network |
| WAN | Wide Area Network |
| WAP | Wireless Access Point |
| WEP | Wired Equivalency Privacy |
| WIFI | Wireless Fidelity |
| WLAN | Wireless Local Area Network |
| WPA | Wireless Protected Access |
| WPA2 | Wireless Protected Access 2 |

# CompTIA IT Fundamentals (ITF+) Proposed Hardware and Software List

CompTIA has included this sample list of hardware and software to assist candidates as they prepare for the CompTIA IT Fundamentals (ITF+) exam. This list may also be helpful for training companies that wish to create a lab component for their training offering. The bulleted lists below each topic are sample lists and not exhaustive.

## EQUIPMENT

- Workstations – unpackaged workstations
- Wireless router
- Cable modem
- Laptop
- Basic printer
- External storage devices
  - Hard drive
  - Solid state drive
- Tablet/smartphone
- Power strip/UPS
- Physical networking devices

## SPARE PARTS/HARDWARE

- Flash drive (for backup)
- Various cable types

## TOOLS

- ESD wrist band (for demonstration)
- Internet connectivity

## SOFTWARE

- OS media
  - Windows
  - Linux
- Unconfigured OS images
- Anti-malware software
- Productivity software
- Collaboration software
- Browser software
- Backup software
- Database software
- Software development packages (IDE)

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