

AP Computer Science Principles Cheat Sheet

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Unit 1: Creative Development

- **Computing Tools:** software, hardware, IDEs, etc.
- **Program Design:** flowcharts, pseudocode, testing strategies
- **Collaboration:** roles, pair programming, code review, version control
- **Algorithms:** step-by-step procedures, sequencing, selection, iteration
- **Problem-Solving Process:** define, plan, implement, test, reflect
- **Abstraction:** simplifying complex problems by focusing on the main ideas
- **Digital Representation:** binary, data compression, and data storage

Additional Notes:

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Unit 2: Data

- **Data Types:** numbers, strings, booleans, lists, etc.
- **Data Representation:** binary, hexadecimal, text (ASCII/Unicode)
- **Data Collection:** surveys, sensors, databases, web scraping
- **Data Storage:** cloud, local storage, databases
- **Data Analysis:** filtering, sorting, visualizing with graphs/charts
- **Big Data:** large datasets, machine learning, predictive analysis
- **Data Security:** encryption, privacy laws (GDPR, HIPAA)

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Unit 3: Algorithms & Programming

- **Programming Languages:** high-level vs. low-level, syntax, semantics
- **Variables:** declaration, initialization, assignment, scope
- **Control Structures:** if-else, loops (for, while), switch-case
- **Functions:** definition, parameters, return values, recursion
- **Debugging:** syntax errors, runtime errors, logic errors, testing
- **Program Efficiency:** time complexity, space complexity (Big-O notation)
- **APIs:** libraries, functions, documentation, integration

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Unit 4: Computer Systems & Networks

- **Computer Components:** CPU, memory, storage, input/output devices
- **Operating Systems:** tasks, file management, user interface
- **Internet:** IP, DNS, HTTP, protocols, packet-switching
- **Network Types:** LAN, WAN, VPN, peer-to-peer, client-server
- **Cybersecurity:** firewalls, antivirus, encryption, phishing, malware
- **Data Transmission:** bandwidth, latency, throughput
- **Cloud Computing:** SaaS, IaaS, PaaS, distributed computing

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Unit 5: Impact of Computing

- **Ethics:** privacy, digital divide, intellectual property, hacking
- **Legal Issues:** copyright, patents, fair use, DMCA
- **Social Impacts:** social media, AI ethics, job automation, bias
- **Global Impact:** digital communication, internet access, globalization
- **Economic Impact:** e-commerce, fintech, gig economy
- **Environmental Impact:** e-waste, energy consumption, green computing
- **Future Trends:** AI, quantum computing, blockchain, IoT

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Unit 6: Simulation & Modeling

- **Simulations:** virtual models, predictions, testing hypotheses
- **Modeling:** abstract representations, simplifications of reality
- **Randomness:** random number generation, Monte Carlo methods
- **Heuristics:** problem-solving approaches, approximation algorithms
- **Data Visualization:** graphs, charts, dashboards, infographics
- **System Modeling:** input-output models, flowcharts, state diagrams
- **Decision Making:** cost-benefit analysis, risk assessment, optimization

Additional Notes: