



The College Board

# *AP Computer Science: Principles*

## Computational Thinking Practices

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*AP Computer Science: Principles* is a pilot course under development. It is not an official Advanced Placement course currently being offered by the College Board.

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- 1. Analyzing effects of computation**
  - a. Identification of existing and potential innovations enabled by computation.
  - b. Identification of ethical implications and positive and negative impacts of computation.
  - c. Analysis of implications of design decisions.
  - d. Characterization of connections between human needs and computational functionality.
  
- 2. Creating computational artifacts**
  - a. Creation of an artifact with a practical, personal, or societal intent.
  - b. Selection of appropriate techniques to develop a computational artifact.
  - c. Use of appropriate algorithms and data structures.
  - d. Location and correction of errors.
  
- 3. Using abstractions and models**
  - a. Explanation of how data, information, and knowledge are represented for computational use.
  - b. Use of simulation and randomness.
  - c. Explanation of how abstractions are used in computation and modeling.
  - d. Collection or generation of data appropriate to a model.
  
- 4. Analyzing problems and artifacts**
  - a. Evaluation of a proposed solution to a problem using multiple criteria.
  - b. Analysis of tradeoffs of multiple solutions to a problem.
  - c. Analysis of the results of running a program or using an artifact.
  - d. Evaluation of characteristics of problems and artifacts.
  
- 5. Communicating processes and results**
  - a. Explanation of how a process or result scales.
  - b. Summarization of the behavior of a computational artifact or process.
  - c. Description using appropriate words and visualizations.
  - d. Justification of appropriateness and correctness.
  
- 6. Working effectively in teams**
  - a. Application of effective teamwork practices.
  - b. Collaboration of participants.
  - c. Production of artifacts that depend on active contribution from multiple participants.
  - d. Documentation describing the use, functionality, and implementation of an artifact.