Computer Science Standards

High School L2

**Post-Secondary Education**

# **Computing Systems**

# **Devices**

# **Hardware and Software**

# **L2.CS.HS.01** Identify the interactions of an operating system between software and hardware.

# **Troubleshooting**

# **Network and the Internet**

# **Network Communication and Organization**

* **L2.NI.NCO.01** Describe the issues that impact network functionality (e.g., bandwidth, load, delay, topology)

# **Cybersecurity**

* **L2.NI.C.01** Compare and refine ways in which software developers protect devices and information from unauthorized access.
* L2.NI.C.02 Learn detection and prevention methods to respond to attacks on sensitive data. Develop a response plan that enables recovery from such attacks.

# **Data Analysis**

# **Storage**

# **L2.DA.S.01** Evaluate and explain the various types of databases, with their specific benefits and limitation

# **Collection, Visualization and Transformation**

* **L2.DA.CVT.01** Use data analysis tools and techniques to identify patterns from complex real‐ world phenomena.
* L2.DA.CVT.02 Generate data sets that support a claim or communicates information using a variety of data collection tools and analysis techniques.

# **Inference and Models**

* L2.DA.IM.01 Use models and simulations to help formulate, refine, and test scientific hypotheses.

# **Algorithms and Programming**

# **Algorithms**

* **L2.AP.A.01** Describe how artificial intelligence drives many software and physical systems (e.g., autonomous robots, computer vision, pattern recognition, text analysis).
* **L2.AP.A.02** Develop an artificial intelligence algorithm to play a game against a human opponent or solve a common problem.
* **L2.AP.A.03** Critically examine and adapt classic algorithms (e.g. selection sort, insertion sort, etc.).
* L2.AP.A.04 Evaluate algorithms (e.g., sorting, searching) in terms of their efficiency, correctness, and clarity.

# **Variables**

* L2.AP.V.01 Compare and contrast simple data structures and their uses (e.g., arrays, lists, stacks, queues, maps, trees, graphs, and databases)

# **Control**

* **L2.AP.C.01** Trace the execution of recursive algorithms, illustrating output and changes in values of named variables.

# **Modularity**

* **L2.AP.M.01** Construct solutions to problems using student‐created components, such as functions, procedures, modules, and/or objects.
* **L2.AP.M.02** Analyze a large‐scale computational problem and identify generalizable patterns that can be applied to a solution.
* **L2.AP.M.03** Create programming solutions using code reuse and applied technique with appropriate attribution (e.g., libraries, APIs, collaboration software, and versioning software).

## **Program Development**

* **L2.AP.PD.01** Compare multiple programming languages and discuss features that make them useful for solving problems and developing systems.
* **L2.AP.PD.02** Using the software life cycle process, create software that will provide solutions for a variety of users.
* **L2.AP.PD.03** Design software in a project team environment using Agile Development methods (e.g., versioning and collaboration systems).
* **L2.AP.PD.04** Explain security issues that might lead to compromised computer programs.
* **L2.AP.PD.05** Develop programs for multiple computing platforms.
* **L2.AP.PD.06** Develop and use a series of test cases to verify that a program performs according to its design specifications.
* **L2.AP.PD.07** Through peer review systematically check code for correctness, usability, readability, efficiency, portability, and scalability (e.g. code review).
* **L2.AP.PD.08** Modify an existing program to add additional functionality and discuss intended and unintended implications with appropriate attribution.

# **Community, Global and Ethical Impacts**

# **Culture**

* **L2.CGEI.C.01** Evaluate the impact of equity, access, and influence on the distribution of computing resources in a global society.
* **L2.CGEI.C.02** Based on research, evaluate how computing has revolutionized an aspect of our culture and predict how it might evolve (e.g., education, healthcare, art/entertainment, and energy).

# **Social Interactions**

# **Safety, Law and Ethics**

* **L2.CGEI.SLE.1** Debate laws and regulations that impact the development and use of software.
* **L2.CGEI.SLE.2** Identify the ethical and moral implications encountered in managing and curating knowledge (e.g., harvesting; information overload; knowledge management; reposting; sharing; summarizing).
* **L2.CGEI.SLE.3** Explain how cutting‐edge technology may affect the way business is conducted in the future (e.g., eCommerce, entrepreneurship, payment methods, business responsibilities)