Louisiana Computer Science

Grade 9 through Grade 12

Computing Systems

1 Hardware and Software H.CS.1

- A Analyze the levels of interactions between application software and system software as well as the hardware layers. H.CS.1A
- B Explain how abstractions hide the underlying implementation details of computing systems embedded in everyday things. H.CS.1B

2 Troubleshooting H.CS.2

- A Generate guidelines that convey systematic troubleshooting strategies that other users can utilize to identify and fix errors. H.CS.2A

Networks and the Internet

1 Hardware and Network Communication H.NI.1

- A Evaluate a network's scalability, reliability, and appropriateness by describing the relationship between routers, switches, devices, topology, and addressing (MAC, IP, Subnet, Gateway). H.NI.1A
- B Illustrate how to trace data through a network model, explaining the interactions that occur throughout the process. H.NI.1B
- C Describe and evaluate the internet as a digital public infrastructure (DPI) from the highest level to the private service provider level. H.NI.1C

2 Cybersecurity H.NI.2

- A Recommend security measures to address factors that create trade-offs between the usability and security of a computing system. H.NI.2A
- B Interpret and analyze mechanisms through which malware and other types of cyber attacks can impact hardware, software, and sensitive data. H.NI.2B
- C Compare and contrast how software developers protect computing systems and information from unauthorized user access. H.NI.2C

Data and Analysis

1 Data Representation H.DA.1

- A Evaluate data representations, propose strategies to reconstruct the data, and visualize data in a variety of ways. H.DA.1A
- B Define and describe database structures to optimize the search and retrieval of data. H.DA.1B

2 Data Collection H.DA.2

- A Explain and describe the impacts of uncertainty and the limitations of data collection technology and tools. H.DA.2A
- B Describe the personal and legal impacts of accumulated data, both collected and derived, for given scenarios. Propose tools and techniques to manage the accumulated data appropriately. H.DA.2B

3 Data Storage H.DA.3

- A Justify choices on how data elements are organized and where data is stored considering cost, speed, reliability, accessibility, privacy, and integrity. H.DA.3A
- B Explain and utilize the appropriate data structural organization system to collaborate and communicate data within a team or user group in given scenarios. H.DA.3B

4 Visualizations and Transformations H.DA.4

- A Create interactive data visualizations using software tools that explain complex data to others. H.DA.4A
- B Utilize data analysis tools to ingest (extract, transform, and load) and process data into relevant information. H.DA.4B

5 Inference and Models H.DA.5

- A Create a model utilizing data with the appropriate simulated variables to develop predictions for real-world phenomena. H.DA.5A
- B Apply and evaluate data analysis techniques to identify patterns represented in complex systems. H.DA.5B
- C Analyze patterns in data visualizations, then select a collection tool to test a hypothesis and communicate the relevant information to others. H.DA.5C
- D Evaluate the impacts of the variables and the model on the performance of a simulation to refine a hypothesis. H.DA.5D

Algorithms and Programming

1 Variables and Algorithms H.AP.1

- A Assess variables, then classify the scope and type of variable. H.AP.1A
- B Design algorithms that can be adapted to express an idea or solve a problem. H.AP.1B
- C Use and adapt classical algorithms to solve computational problems. H.AP.1C
- D Explain what computer memory is and how variables are stored and retrieved. H.AP.1D
- E Identify and explain how a derived data type can be utilized in a real-world scenario. H.AP.1E

2 Control Structures H.AP.2

- A Justify the selection of control structures to balance implementation complexity, maintainability, and program performance. H.AP.2A
- B Design and iteratively develop computational artifacts using events to initiate instructions. H.AP.2B

3 Modularity H.AP.3

- A Decompose problems into smaller components using constructs such as procedures, modules, and/or objects. H.AP.3A
- B Create computational artifacts using procedures within a program, combinations of data and procedures, or independent but interrelated programs. H.AP.3B

4 Program Development H.AP.4

- A Utilize the Software Development Life Cycle (SDLC) to create software that is a minimum viable product. H.AP.4A
- B Develop and utilize test cases to verify that a program performs according to the program's design specifications. H.AP.4B
- C Design and develop programs by working in team roles using version control systems, integrated development environments (IDEs), and collaborative tools and practices. H.AP.4C
- D Evaluate licenses that limit or restrict the use of computational artifacts when utilizing resources such as libraries. H.AP.4D
- E Apply the appropriate documentation techniques to make programs more accessible to debug and to be maintained by others. H.AP.4E
- F Iteratively evaluate and modify an existing program to add functionality and discuss intended and unintended implications. H.AP.4F
- G Use a standard library and/or application programming interface (API) to create reusable code components to design simple programs and enhance existing programs. H.AP.4G

Impacts of Computing

1 Intellectual Achievements H.IC.1

- A Analyze the key milestones of computer science, historical events influenced by computer science, and the people connected to these achievements. H.IC.1A
- B Explain how innovations in computer science and technology enable advancements in other fields of study. H.IC.1B

2 Social Interaction H.IC.2

- A Evaluate the adoption and adaptation of social norms from the physical world to the cyber world. H.IC.2A
- B Describe how cyberspace is becoming a universal medium for connecting humans, the economy, business, and computing. H.IC.2B
- C Describe and critique how algorithmic feedback loops can shape perceptions, reinforce a limited data set, and limit the sources of information that may inform the individual user. H.IC.2C

3 Laws, Safety, and Industry Practices H.IC.3

- A Debate laws and industry regulations that impact the development and use of computational artifacts. H.IC.3A
- B Describe and analyze the motives of online threat actors to a user's personal safety, privacy, and well-being. H.IC.3B
- C Compare and contrast the varied approaches to govern data, intellectual property, control information access, and various ways for users to be aware of guidance. H.IC.3C
- D Explain how the interconnectedness of cyberspace can lead to physical and digital vulnerabilities. H.IC.3D
- E Debate the ethical considerations of creating and publishing computational artifacts. H.IC.3E
- F Analyze the data provenance of computational artifacts. H.IC.3F
- G Explain how individuals and organizations can exert influence on personal and societal perceptions and practices through computing technologies. H.IC.3G