# Ohio's Learning Standards Computer Science, Grade 7

ADOPTED JULY 2022



# **Grade 7 Standards**

# **COMPUTING SYSTEMS**

#### **Devices**

**CS.D.7.a** Develop and implement a process to evaluate existing computing devices capabilities based on personal interaction with the device.

### Hardware and Software

**CS.HS.7.a** Evaluate hardware and software combinations used to accomplish a task.

# Troubleshooting

**CS.T.7.a** Use a systematic process to identify and evaluate the source of a routine computing problem. Select the best solution to solve the computing problem and communicate the solution to others.

# **NETWORKS AND THE INTERNET**

#### Networking

**NI.N.7.a** Explain the role of hardware components and diagram the infrastructure of networks and the internet (including cloud servers).

**NI.N.7.b** Explain the protocols (i.e., rules) and why they are used to transmit data across networks and the internet.

### Cybersecurity

**NI.C.7.a** Identify and apply introductory methods of encryption to model the secure transmission of information.

**NI.C.7.b** Describe the types of malware to show how malware affects information.

**NI.C.7.c** Identify cybersecurity concerns and measures needed to protect electronic information.

### Internet of Things (IoT)

**NI.IOT.7.a** Explain the positive and negative impacts of IoT as it applies to daily life and create ways to mitigate the negative impacts on society.

# DATA AND ANALYSIS

#### **Data Collection and Storage**

**DA.DCS.7.a** Compare and contrast digital data collection tools to make them more useful and reliable.

**DA.DCS.7.b** Evaluate various file formats to understand data storage capabilities.

**DA.DCS.7.c** Create a logical file structure to organize data to support individual and collaborative work.

#### **Visualization and Communication**

**DA.VC.7.a** Communicate relations between data sets to interpret results.

**DA.VC.7.b** Create a spreadsheet utilizing formulas, functions and graphs to represent and analyze data.

# **Inference and Modeling**

**DA.IM.7.a** Create and analyze models and simulations to accurately hypothesize a real-world situation.

# ALGORITHMIC THINKING AND PROGRAMMING

### **Algorithms**

**ATP.A.7.a** Select and modify pseudocode for a multi-step process to solve a problem.

Variables and Data Representation

**ATP.VDR.7.a** Use test cases to trace variable values to determine the result.

#### **Control Structures**

**ATP.CS.7.a** Use and apply decisions and loops in a program to solve a problem.

### Modularity

**ATP.M.7.a** Decompose problems into parts to facilitate the design, implementation and review of increasingly complex programs.

### **Program Development**

**ATP.PD.7.a** Write code that utilizes algorithms, variables and control structures to solve problems or as a creative expression.

ATP.PD.7.b Test, trace and debug to refine code.

ATP.PD.7.c Identify procedures that utilize parameters.

# **ARTIFICIAL INTELLIGENCE**

#### Perception

**AI.P.7.a** Give examples of how intelligent agents combine information from multiple sensors to react to an input.

**AI.P.7.b** Describe how edge detectors can be composed to form more complex feature detectors, e.g., for letters or shapes.

**AI.P.7.c** Illustrate the concept of feature extraction from images by simulating an edge detector.

#### **Representation & Reasoning**

**AI.RR.7.a** Compare several algorithms that could be used to solve a specific type of reasoning problem.

#### **Machine Learning**

**AI.ML.7.a** Model how unsupervised learning finds patterns in unlabeled data to identify how machine learning takes place.

**AI.ML.7.b** Create a dataset for training a decision tree classifier or predictor to explore the impact that different feature encodings have on the decision tree.

#### **Natural Interactions**

**AI.NI.7.a** Curate a dataset to train a language-processing algorithm to create a program that incorporates voice commands.

**AI.NI.7.b** Identify the components of a chatbot and explain how each component contributes to the chatbot's human-like responses.

#### **Societal Impacts**

**AI.SI.7.a** Identify and explain the effect training data has on the accuracy of an artificial intelligence system to uncover bias in training data.

**AI.SI.7.b** Identify and explain the problems of classification in the supervised artificial intelligence context to create data sets that are inclusive and accurate.

# IMPACTS OF COMPUTING

#### Culture

**IC.Cu.7.a** Compare current technologies from the present to the past to evaluate the effect on people's everyday activities.

**IC.Cu.7.b** Evaluate various technologies to identify issues of bias and accessibility.

**IC.Cu.7.c** Identify and explore careers related to the field of computer science.

IC.Cu.7.d Explain how computing impacts innovation in other fields.

### **Social Interactions**

**IC.SI.7.a** Analyze and present beneficial and harmful effects of electronic communications to understand their impacts on interpersonal, global, economic, political, business and cultural interactions.

#### Safety, Law and Ethics

**IC.SLE.7.a** Describe tradeoffs between allowing information to be public and keeping information private and secure to inform decision-making.

**IC.SLE.7.b** Identify the social and economic implications of privacy in the context of safety, law or ethics to understand how privacy impacts these areas.

**IC.SLE.7.c** Evaluate the development of new technologies in communication, entertainment and business to understand the impact.

**IC.SLE.7.d** Provide appropriate credit when using resources or artifacts that are not our own.

**IC.SLE.7.e** Explain the connection between the longevity of data on the internet, personal online identity and personal privacy.

