

Concept	Indicator	Indicator Statement	FIRST TECH CHALLENGE Team	FIRST ROBOTICS COMPETITION	FIRST TECH CHALLENGE Class Pack
Algorithms and Programming	3A-AP-13	Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.	x	x	X
	3A-AP-14	Demonstrate the use of both linked lists and arrays to simplify solutions, generalizing computational problems instead of repeatedly using simple variables.	-	-	-
	3A-AP-15	Justify the selection of specific control structures when tradeoffs involve implementation, readability, and program performance, and explain the benefits and drawbacks of choices made.	x	x	x
	3A-AP-16	Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue by using events to initiate instructions.	X	x	x
	3A-AP-17	Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.	x	x	X
	3A-AP-18	Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs.	X	x	x
	3A-AP-19	Systematically design and develop programs for broad audiences by incorporating feedback from users.	x	x	X
	3A-AP-20	Evaluate licenses that limit or restrict use of computational artifacts when using resources such as libraries	-	-	X
	3A-AP-21	Evaluate and refine computational artifacts to make them more usable by all and accessible to people with disabilities.	-	-	-
	3A-AP-23	Design and develop computational artifacts working in team roles using collaborative tools.	x	x	X
Computing Systems	3A-CS-01	Explain how abstractions hide the underlying implementation details of computing systems embedded in everyday objects.	-	-	X
	3A-CS-02	Compare levels of abstraction and interactions between application software, system software, and hardware layers.	-	-	x
	3A-CS-03	Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.	x	x	X
Data and Analysis	3A-DA-09	Translate between different bit representations of real-world phenomena, such as characters, numbers, and images (e.g., convert hexadecimal colors to decimal percentages, ASCII/Unicode representation).	x	x	x

	3A-DA-10	Evaluate the tradeoffs in how data elements are organized and where data is stored.	x	x	X
	3A-DA-11	Create interactive data visualizations or alternative representations using software tools to help others better understand real-world phenomena.	-	x	x
	3A-DA-12	Create computational models that represent the relationships among different elements of data collected from a phenomenon, process, or model.	-	x	X
Impacts of Computing	3A-IC-24	Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices	-	-	x
	3A-IC-25	Test and refine computational artifacts to reduce bias and equity deficits.	-	-	-
	3A-IC-26	Demonstrate ways a given algorithm applies to problems across disciplines	X	x	x
	3A-IC-27	Use tools and methods for collaboration on a project to increase connectivity of people in different cultures and career fields.	-	-	x
	3A-IC-28	Explain the beneficial and harmful effects that intellectual property laws can have on innovation.	-	-	X
	3A-IC-29	Explain the privacy concerns related to the collection and generation of data through automated processes that may not be evident to users.	x	x	X
	3A-IC-30	Evaluate the social and economic implications of privacy in the context of safety, law, or ethics.	-	-	x
Networks and the Internet	3A-NI-04	Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing.	-	-	-
	3A-NI-05	Give examples to illustrate how sensitive data can be affected by malware and other attacks.	-	-	x
	3A-NI-06	Recommend security measures to address various scenarios based on factors such as efficiency, feasibility, and ethical impacts.	-	-	-
	3A-NI-07	Compare various security measures, considering tradeoffs between the usability and security of a computing system.	-	-	-
	3A-NO-08	Explain tradeoffs when selecting and implementing cybersecurity recommendations.	-	-	-