

COMPUTATIONAL THINKING

<https://docs.google.com/a/udel.edu/document/d/1hdGUS1DhktduBuz6D9ZisOGnpxLEVbll4wnap8-6D4/edit?usp=sharing>

Criteria	Capstone (4)	Milestone (3)	Milestone (2)	Benchmark (1)
Problem Decomposition break down tasks into smaller, manageable parts	Identify a large-scale problem. Break the problem into smaller manageable parts. Identify variables to the problem and omit extraneous variables. Determine which variables are controllable and which are determined by outside factors.			
Abstraction reduce complexity to define main idea	Identify characteristics of something to reduce to a set of essential characteristics. Find similarities and disregard unimportant differences in processes or objects. Reduce a data set to a simplified representation (model).			
Algorithms series of ordered steps taken to solve a problem or achieve some goal	Develop a sequence of steps or instructions to accomplish a task or solve a problem. Refine an algorithm based on testing under different scenarios (inputs) for correctness and efficiency.			

<p>Automation enable computers or machines to perform repetitive or tedious tasks</p>	<p>Identify opportunities for and benefits of automation; Use automated tools to perform mundane tasks; Articulate the pros and cons of automation in society; Create an artifact that involves automation (e.g., a program, machine, model of a machine)</p>			
<p>Simulation representation or model of a process. Also involves running experiments using models</p>	<p>Create a simulation of a process using software, animation, people, objects, spreadsheet or other appropriate medium.</p>			
<p>Parallelization organize resources to simultaneously perform tasks to reach a common goal</p>	<p>In a project with many subtasks, identify tasks that need to be done sequentially and tasks that can be done simultaneously, and when check-ins need to be done and things put together to meet the deadlines efficiently</p>			
<p>Data Collection gather appropriate information</p>	<p>Given a problem, project, or study, determine the appropriate information to collect and be able to identify extraneous, useless information to collect. Design instruments (eg surveys, experiments) to collect the appropriate (qualitative or quantitative) data.</p>			

Data Representation	Determine effective representations (eg tables, graphs, charts) or visualizations to help extract meaningful conclusions from a set of raw data			
Data Analysis	Using either data visualization or statistical tools, identify and describe trends and patterns in a data set, and test posed hypotheses or conclusions			

References: <http://csta.acm.org/Curriculum/sub/CurrFiles/CompThinkingFlyer.pdf>
http://csta.acm.org/Curriculum/sub/CurrFiles/472.11CTTeacherResources_2ed-SP-vF.pdf