

CTY SUMMER PROGRAM

Fundamentals of Computer Science (FCPS)

Syllabus

		Morning	Afternoon	Evening
Week 1	Day 1 (Monday)	Antikythera		
		Concepts: <i>* Introduction, pre-assessment</i> <i>* Boolean Logic(peak at FOL)</i> <i>* Evaluating Expressions: BDD</i> + Exercises, Handouts	Lab Session: <i>OO and Java</i> <i>Intro to IDEs: Eclipse Lab</i>	Application: <i>Programming Exercise</i> <i>Recap of concepts through problem solving</i>
	Day 2 (Tues day)	Atanasoff		
		Concepts: <i>* Number Systems,ASCII,HEX</i> <i>* Logic Gates</i> <i>* Building Circuits, Von Neumann</i> + Exercises, Handouts	Lab Session: <i>Primitive Types</i> <i>Variables</i> <i>Assignment Statement</i> <i>Computation</i>	Application: <i>Programming Exercise</i> <i>Recap of concepts through problem solving</i>
	Day 3 (Wednes day)	Möbius		
		Concepts: <i>* Assembly Language operations</i> <i>* Algorithms: pseudocode</i> <i>* Search & Sort Basics</i> + Exercises, Handouts	Lab Session: <i>Control Statements</i> <i>If-Then-Else</i> <i>Mathematical Expressions</i>	Application: <i>Programming Exercise</i> <i>Recap of concepts through problem solving</i>
Day 4 (Thurs day)	Königsburg			
	Concepts: <i>* Graph Theory with Algorithms</i> <i>* Computational Models</i> <i>* Formal Languages</i> + Exercises, Handouts	Lab Session: <i>Keyboard input</i> <i>While statement</i>	Application: <i>Programming Exercise</i> <i>Recap of concepts through problem solving</i>	
Day 5 (Friday)	Nice			
	Concepts: <i>* Regular Expressions</i> <i>* Automata Theory</i> <i>* DFAs & NFAs</i> + Exercises, Handouts	Lab Session: <i>For statement</i> <i>Input/Output</i>	Application: <i>Programming Exercise</i> <i>Recap of concepts through problem solving</i>	

Week 2

	Morning	Afternoon	Evening
<p>Day 6 (Monday)</p> <p>Day 7 (Tuesday)</p> <p>Day 8 (Wednesday)</p> <p>Day 9 (Thursday)</p> <p>Day 10 (Friday)</p>	Klimt		
	<p>Concepts:</p> <ul style="list-style-type: none"> * Cellular Automata * The Game of Life * Context-free grammar graphics <p>+ Exercises, Handouts</p>	<p>Lab Session:</p> <p>Data Structures: Arrays</p> <p>Fun with One-dimensional arrays</p>	<p>Application:</p> <p>Programming Exercise</p> <p>Recap of concepts through problem solving</p>
	Lewitt		
	<p>Concepts:</p> <ul style="list-style-type: none"> * Computational Models * Turing Machine * Decidability & Complexity <p>+ Exercises, Handouts</p>	<p>Lab Session:</p> <p>Fun with Classes</p>	<p>Application:</p> <p>Programming Exercise</p> <p>Recap of concepts through problem solving</p>
	Enigma		
<p>Concepts:</p> <ul style="list-style-type: none"> * Algorithms Revisited * Efficiency & Complexity * P vs. NP <p>+ Exercises, Handouts</p>	<p>Lab Session:</p> <p>Information Hiding & Encapsulation</p>	<p>Application:</p> <p>Programming Exercise</p> <p>Recap of concepts through problem solving</p>	
LHC			
<p>Concepts:</p> <ul style="list-style-type: none"> * Reference Model: OSI * LAN's & WANs * Hubs, Switches, Routers <p>+ Exercises, Handouts</p>	<p>Lab Session:</p> <p>Overloading</p> <p>Constructors</p>	<p>Application:</p> <p>Programming Exercise</p> <p>Recap of concepts through problem solving</p>	
Dijkstra			
<p>Concepts:</p> <ul style="list-style-type: none"> * Network Services & Protocols * History of the Web * Dijkstra's Algorithm <p>+ Exercises, Handouts</p>	<p>Lab Session:</p> <p>Fun with Recursion</p>	<p>Application:</p> <p>Programming Exercise</p> <p>Recap of concepts through problem solving</p>	

	Morning	Afternoon	Evening	
Week 3	Berners-Lee			
	Day 11 (Monday)	Concepts: * <i>Building Web Pages</i> * <i>HTML</i> * <i>Java Script</i> + Exercises, Handouts	Lab Session: <i>Inheritance</i>	Application: <i>Programming Exercise</i> <i>Recap of concepts through problem solving</i>
	Escher			
	Day 12 (Tuesday)	Concepts: * <i>Artificial Intelligence</i> * <i>First-Order Logic</i> * <i>Alice in Wonderland</i> + Exercises, Handouts	Lab Session: <i>Data Structures: Lists</i> <i>Fun with Linked-Lists</i>	Application: <i>Programming Exercise</i> <i>Recap of concepts through problem solving</i>
	Maude			
	Day 13 (Wednesday)	Concepts: * <i>Multi-lingual programmer</i> * <i>Combining Concepts: Maude</i> + Exercises, Handouts	Lab Session: <i>Applets</i> <i>Fun with Puzzles</i>	Application: <i>Programming Exercise</i> <i>Recap of concepts through problem solving</i>
Queens				
Day 14 (Thursday)	Concepts: * <i>Combining Concepts: Security, FOL & Automata</i> * <i>Presentations of Web Projects</i> + Exercises, Handouts	Lab Session: <i>Sorting Algorithms</i> <i>Backtracking</i>	Application: <i>Programming Exercise</i> <i>Recap of concepts through problem solving</i>	
ACM				
Day 15 (Friday)	Concepts: * <i>Ethics in Computer Science</i> + Future Reading			