CSI-SPARK Preparatory Workshop - Session Dates - AY2022-2023

Sessions run 2:15 to 3:15 pm (60 minutes) on Mondays

10/3/2022 Session 01 - Python Fundamentals variables, data types, print for loops, range, functional Equation 10/17/2022 Session 02 - Arrays and Algorithms numpy arrays, vectorized operations random numbers coprime_probability.py if statement, mod operator 10/24/2022 Session 03 - 2D Graphics Plotting (matplotlib) Polar Coordinates Plarametric Equations Precision, Rate of Convergence Mean, Natural Logarithm Complex Numbers, Series 11/7/2022 Session 05 - Data Structures and Files Lists & Tuples, CSV Files Dictionaries, JSON Files Binary Data, Pickle Files 12/5/2022 Session 06 - Strings and Histograms Encodings, ASCII, UTF-8 Reading Text Files Frequency Analysis 12/19/2022 Session 07 - Probabilty and Statistics Mean, Variance, Std Deviation Moment of Distribution Uniform_variance.py Central Limit Theorem Solving Systems of Linear Equations Darrisley fern.py Affine Transformations Darrisley fern.py Affine Transformations Darrisley fern.py Darrisley deren.py Larrisle parsies, prency Darrisle,	Date	Topics	Source Code File		
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		Affine Transformations	barnsley_fern.py		

1/3	0/2023	Session	09 -	Curve	Fitting
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Linear Regression	ohms_law.py
Quadratic Regression	breaking_distance.py
Spline Interpolation	cubic_splines.py

2/6/2023 **Session 10 - 3D Graphics**

3D Cartesian Coordinates	plot3d_monolith.py
Oblique Projection, Vertices, Facets	plot3d_pyramid.py
Spherical Coordinates	plot3d_sphere.py
Volume of Revolution	plot3d_torus.py

2/27/2023 Session 11 - Symbolic Computing

Sympy, Algebraic Symbols	factor_quadratic.py
Analytic Solutions	equation_solver.py
Squeeze Theorem	find_limits.py

3/6/2023 Session 12 - Monte Carlo Methods

Fixed Grid vs. Random Sampling	mc_circle_prng.py
Quasi-Random Numbers	mc_circle_qrng.py
Pythagorean Theorem	mc_sphere_qrng.py
Halton QRNG - Four Dimensions	mc_hypersphere.py
High Dimensional Hyperspheres	mc_high_dimensions.py

3/20/2023 Session 13 - Pandas Data Science

Pandas Dataframes	sunspot_frequency.py
Analyzing Data	auto_mpg.py
Plotting Data	pulse_activity.py

4/3/2023 Session 14 - Waves and Animation

Sampling Theorem, Aliasing	nyquist_sampling.py
Superposition, Standing Waves	travelling_waves.py

4/17/2023 Session 15 - Machine Learning

Outlier Identification	k_means.py
Image Classification and Prediction	image_classification.py

5/1/2023 Session 16 - Computational Biology and Chemistry

Genotypes, Punnett Squares	mendelian_inheritance.py
Balacing Ionic Equations	stoichiometry.py

5/15/2023 **Session 17 - Computational Physics**

Equation of Motion, Kinematics	projectile_motion.py
Exponential Decay, Euler's Method	nuclear decay.py