

CHAPTER 1

Basic Input/Output, Expressions & Selection

ID	Task name	Python	C++
Basic Program Output			
E1011	My First Output	•	•
E1012	Two Exact Lines	•	•
E1013	Trace Program Output	•	•
E1014	Greeting	•	•
Variables, Types, and Input/Output			
E1111	First Integer Input	•	•
E1112	Values after Assignments	•	•
E1113	Copy a Value	•	•
E1114	Preserve the First Value	•	•
E1115	Two Integers on One Line	•	•
E1116	Large Integer Input		•
E1117	Choose a C++ Integer Type		•
Arithmetic Expressions and Constants			
E1211	Opposite Number	•	•
E1212	Twice the Number	•	•
E1213	Square of a Number	•	•
E1214	Sum of Two Numbers	•	•
E1215	Ordered Difference	•	•
E1216	Product of Two Numbers	•	•
E1217	Add Then Multiply	•	•
E1218	Named Constant	•	•
E1231	Rectangle Perimeter	•	•
Comparisons and Boolean Expressions			
E1311	Comparison Results	•	•
E1312	Boolean Comparison Result	•	•
E1313	Inside Both Bounds as a Boolean Expression	•	•
E1314	Outside Either Bound as a Boolean Expression	•	•
E1315	Use NOT with Equality	•	•
E1331	Chained Comparison	•	•
E1381	Combine Boolean Conditions	•	•
Selection			
E1411	Positive Number Check	•	•
E1412	Freezing Point	•	•
E1413	Inside Both Bounds	•	•
E1414	Outside Either Bound	•	•
E1415	Course Pass Check	•	•
E1416	Three Number Signs	•	•
E1417	Pass Boundary	•	•
E1418	Temperature Band	•	•
E1419	The Greater Number	•	•
E1420	Boundary Conditions	•	•
E1421	Grade Bands	•	•
E1422	Nested Admission Check	•	•
E1431	Greater Value Expression	•	•
E1432	Stop at the First Failed Check	•	•
Integer Division and Remainder			
E1511	Quotient and Remainder	•	•
E1512	Even or Odd	•	•
E1513	Divisible or Not	•	•
E1514	Last Digit	•	•
E1515	Tens Digit	•	•
E1516	Divide and Round Up	•	•
E1531	Hundreds, Tens, and Units	•	•
E1532	Minutes into Hours	•	•
Applying Arithmetic and Selection			
E1631	Discounted Total	•	•
E1632	Free Delivery	•	•
E1633	One Step of the 3n + 1 Rule	•	•
E1681	Triangle Validity and Type	•	•
E1682	Special Case for the Last Two Digits	•	•
Decimal Arithmetic and Rounding			
E1711	First Decimal Input	•	•
E1712	Add One Half	•	•
E1713	Average of Two Integers	•	•
E1714	Output Two Decimal Places	•	•
E1715	Two Decimals on One Line	•	•
E1716	Round to the Nearest Integer	•	•
E1717	Two Rules for Rounding: 5 Values	•	•
E1718	Arithmetic Compound Assignment	•	•
E1719	Convert a Decimal to Tenths	•	•
Mathematical Functions and Numerical Accuracy			
E1811	Square Root of a Perfect Square	•	•
E1812	Absolute Value	•	•
E1813	Floor and Ceiling	•	•
E1814	Truncation and Floor	•	•
E1831	Greater Coordinate Difference	•	•
E1832	Number of Real Roots	•	•
E1833	Sine of an Angle in Radians	•	•
E1834	Degrees into Radians	•	•
E1835	Evaluate a Quadratic Formula Value	•	•
E1836	Floating-Point Equality	•	•
E1881	Check a Square-Root Candidate	•	•
E1882	Check a Large Square-Root Candidate	•	•
E1883	Four Ways to Round to an Integer	•	•
E1884	Height from an Angle	•	•
Number Representation and Bitwise Operations			
E1931	Binary Place Values	•	•
E1932	4-Bit Binary to Decimal	•	•
E1933	Decimal to 4-Bit Binary	•	•
E1934	Hexadecimal Place Values and Conversion	•	•
E1935	Decimal to Hexadecimal	•	•
E1936	Two's Complement Representation	•	•
E1937	AND, OR, and XOR Truth Tables	•	•
E1938	Bitwise AND, OR, and XOR	•	•
E1939	Bitwise Complement	•	•
E1981	4-Bit Addition and Overflow	•	•
E1982	4-Bit Binary Subtraction	•	•

CHAPTER 2

Loops and Iteration

ID	Task name	Python	C++
For Loops			
E2011	My First Loop	•	•
E2012	Input-Controlled Loop	•	•
E2013	Done Once at the End	•	•
Range Traversal			
E2111	Count Up to N	•	•
E2112	From 0 to N - 1	•	•
E2113	From A to B	•	•
E2114	Count Down	•	•
E2115	Multiples of K	•	•
E2116	Numbers on One Line	•	•
E2117	Output Clap for Multiples	•	•
E2131	Count from A to B in Steps of K	•	•
E2132	Clap Rule	•	•
Loop Accumulation			
E2211	Initialize Before the Loop	•	•
E2212	Sum to N	•	•
E2213	Sum of Multiples	•	•
E2214	Sum of Entered Values	•	•
E2215	Running Totals	•	•
E2216	Factorial	•	•
E2217	Average of Entered Integers	•	•
E2231	Sum from A to B	•	•
E2232	Sum of Squares	•	•
Numerical Summaries			
E2311	Count Positive Values	•	•
E2312	Count Values in a Range	•	•
E2313	Sum Positive Values	•	•
E2314	Largest Entered Value	•	•
E2315	Was There a Zero?	•	•
E2316	Count Increases	•	•
E2317	Are All Marks Valid?	•	•
E2331	Initialize the Minimum Correctly	•	•
E2332	Largest Two of Three Values	•	•
E2333	Running Maximum Minus Minimum	•	•
While Loops			
E2411	While Loop	•	•
E2412	Add K Until Reaching B	•	•
E2413	Steps to Reach B	•	•
E2414	Number of Digits	•	•
E2415	Digit Sum	•	•
E2416	Sum Until Zero	•	•
E2417	Handle the Terminating Zero	•	•
E2431	Repeated Subtraction	•	•
E2432	Subtract Until Negative	•	•
Nested Loops			
E2511	3 by 4 Grid Coordinates	•	•
E2512	Grid Coordinates	•	•
E2513	Coordinates Column by Column	•	•
E2514	A Row of # Characters	•	•
E2515	Solid Rectangle	•	•
E2516	Growing Triangle	•	•
E2517	Leading Spaces and One #	•	•
E2531	Coordinate Sums	•	•
E2532	Cells with Coordinate Sum Below K	•	•
E2533	Row Number Grid	•	•
E2534	Solid Diamond	•	•
E2535	Multiplication Grid	•	•
E2536	Checkerboard	•	•
E2581	Upper Half of a Hollow Diamond	•	•
Factors and Prime Numbers			
E2611	List All Factors	•	•
E2612	Prime or Composite	•	•
E2631	Number of Factors	•	•
E2632	Repeatedly Divide by K	•	•
E2633	Try the Given Prime Factors	•	•
E2681	Prime Factorization	•	•
E2682	Factor Pairs up to the Square Root	•	•
Break and Continue			
E2711	Skip and Stop	•	•
E2712	First Value with Digit Sum K	•	•
E2713	Sum Squares with Digit-Sum Skips	•	•
E2714	Valid Guesses Before Success	•	•
E2731	Completion Marker	•	•
E2732	First Digit-Sum Match or None	•	•
E2733	Weather Watch	•	•
Loop State			
E2811	Preserve Old Values	•	•
E2812	Repeat the Two-Value Update	•	•
E2831	GCD by Remainders	•	•
E2881	LCM from a Supplied GCD	•	•
Sequence Relationships			
E2931	Longest Increasing Run	•	•
E2981	Multiply Crosswise and Subtract	•	•
E2982	Accumulating Adjacent Pair Results	•	•

CHAPTER 3

Strings and Characters

ID	Task name	Python	C++
String Input/Output and Basic Operations			
E3011	Read and Output a Word	•	•
E3012	Whole-Line Input	•	•
E3013	Join Two Words	•	•
E3014	Word Length	•	•
E3015	Spaces and Line Length	•	•
E3016	Number Then Whole-Line Input	•	•
E3017	Repeat a Word	•	•
E3018	Number and Suffix	•	•
String Indexing			
E3111	First Character	•	•
E3112	Last Character	•	•
E3113	Character at a Position	•	•
E3131	Middle Index	•	•
E3132	Characters from Both Ends	•	•
String Traversal and Counting			
E3211	One Character per Line	•	•
E3212	Count a Target Character	•	•
E3213	Positions of a Character	•	•
E3214	Adjacent Character Pairs	•	•
E3231	Count Lowercase Vowels	•	•
E3232	Count Spaces	•	•
E3233	Words with Flexible Spacing	•	•
Character Classification and Codes			
E3311	Letter, Digit, or Symbol	•	•
E3312	Character Code	•	•
E3313	Digit Character to Number	•	•
E3314	Alphabet Position	•	•
E3315	Count Digits	•	•
E3331	Weighted Digit Sum	•	•
E3332	Chess Square Coordinates	•	•
String Construction and Transformation			
E3411	Copy a String	•	•
E3412	Add Hyphens Between Characters	•	•
E3413	Remove a Character	•	•
E3414	Mask Vowels	•	•
E3415	Reverse a String	•	•
E3416	Replace One Character	•	•
E3431	Keep Only Digits	•	•
E3432	Characters at Even Positions	•	•
E3433	Update Characters by Reference	•	•
E3481	Reveal State after One Guess	•	•
E3482	Progressive Word Reveal	•	•
String Comparison and Case Normalization			
E3511	Exact String Match	•	•
E3512	Dictionary Order	•	•
E3513	Convert to Uppercase	•	•
E3514	Compare Ignoring Case	•	•
String Searching and Substring Extraction			
E3611	Contains a Character	•	•
E3612	First Character Position	•	•
E3613	Pattern at One Position	•	•
E3614	Contains a Pattern	•	•
E3615	Count Non-overlapping Matches	•	•
E3616	Split at a Separator	•	•
E3631	Overlapping and Non-overlapping Matches	•	•
E3632	Count Overlapping Matches	•	•
String Validation			
E3711	All Decimal Digits	•	•
E3731	Palindrome Check	•	•
E3781	Exactly One At Sign	•	•
E3782	Safe Dot Placement	•	•
E3783	Valid Username Component	•	•
Text Formats			
E3811	Read One Operation	•	•
E3812	Evaluate One Operation	•	•
E3813	Operator Precedence	•	•
E3814	Parse a Key-Value Record	•	•
E3815	Decimal with a Prefix	•	•
E3816	Format Currency from Tenths	•	•
E3831	Double a Prefixed Price	•	•
E3832	Convert 12-Hour Time	•	•
E3833	Format 24-Hour Time	•	•
E3834	Format an Integer with Thousand Separators	•	•
E3835	Compact Comparison	•	•

CHAPTER 4

Arrays and Lists

ID	Task name	Python	C++
Array Fundamentals			
E4011	Store One-Line Input	•	•
E4012	Initialize Stored Values	•	•
E4013	Add a Value	•	•
E4014	Traverse Stored Values	•	•
E4015	First and Last Stored Values	•	•
E4016	Element at a Position	•	•
E4017	Change One Element	•	•
E4018	Reverse Traversal	•	•
E4019	Nondecreasing Order	•	•
E4020	Print Stored Values Using Unpacking	•	•
E4021	Join a List of Values	•	•
Queries over Arrays			
E4111	Sum of a Segment	•	•
E4112	Segment Minimum and Maximum	•	•
E4113	Multiple Position Queries	•	•
E4131	Target Count after Storage	•	•
E4181	Prefix Totals for Segment Queries	•	•
Array Search and Replacement			
E4211	First Matching Position	•	•
E4212	Replace Every Match	•	•
E4231	First and Last Matching Positions	•	•
Array Mutation and Rearrangement			
E4311	Swap Two Elements	•	•
E4312	Delete One Element Manually	•	•
E4313	Insert One Element Manually	•	•
E4314	Multiple Point Updates	•	•
E4315	Reverse a Segment	•	•
E4316	Move One Element to the Front	•	•
E4331	Remove All Target Values	•	•
E4332	Delete and Insert with List Methods	•	•
E4381	Rotate Left by K Positions	•	•
Frequency Tables and Presence Markers			
E4411	Frequencies of 0, 1, and 2	•	•
E4412	Digit Frequencies	•	•
E4413	Lowercase Letter Frequencies	•	•
E4414	Detect a Repeated Value	•	•
E4431	Updating Frequency Counts	•	•
E4432	First Appearances	•	•
Two-dimensional Array Fundamentals			
E4511	Independent Grid Rows	•	•
E4512	Store a Numeric Grid	•	•
E4513	Traverse a Numeric Grid	•	•
E4514	Cell at Row and Column	•	•
E4515	Change One Cell	•	•
E4516	Sum of a Row	•	•
E4517	Sum of a Column	•	•
E4518	Character Grid Input	•	•
E4531	Choose a Diagonal	•	•
E4532	Adult Fare Matrix Lookup	•	•
Grid Traversal and Transformations			
E4611	Horizontal Grid Mirror	•	•
E4612	Swap Two Grid Rows	•	•
E4613	Valid Orthogonal Neighbours	•	•
E4631	Grid Border without Repeated Corners	•	•
E4632	Update Then Find the Maximum	•	•
E4681	Rectangular Transpose Coordinates	•	•
E4682	Tic-Tac-Toe Winning Line	•	•
Parallel Arrays			
E4711	Weighted Total	•	•
E4712	Item Number Lookup	•	•
E4731	Alternate Two Sequences	•	•
E4732	Word from Letter Tiles	•	•
Language-specific Array Behavior and Idioms			
E4831	Array Capacity Check	•	•
E4832	Alias and Slice Copy	•	•
E4833	List Comprehension Transformation	•	•
Sieve Initialization and Marking			
E4981	Mark Multiples of One Prime	•	•
E4982	Mark Multiples of Prime Candidates	•	•

DSE Exercises

ID	Task name
D100	Calculate A+B
D101	Phone number
D102	Bus fare
D103	Area of triangle
D104	Roots of quadratic equation
D105	Date comparison
D106	Ordinal number
D107	Square and triangular numbers
D108	Simple calculator
D109	Segment Intersection
D110	King movement
D111	Body Mass Index
D112	Bitwise operations
D201	Fibonacci numbers
D202	Factors
D203	Clap 7
D204	Text graphics
D205	Prime factorization
D206	3n+1 problem
D207	GCD and LCM
D208	Maximum and second maximum
D209	Sequence validation
D210	Area of polygon
D211	Election Leader
D301	Story generator
D302	String length and words
D303	String reverse and palindrome
D304	Hangman
D305	Check digit calculation
D306	Email address validator
D307	Tic-tac-toe
D308	Substrings
D309	Case-insensitive comparison
D401	Sieve of Eratosthenes
D402	Supermarket
D403	Scrabble
D404	Heung Shing MTR fare
D405	Buildings in Heung Shing
D406	Remove duplicates
D407	Chinese Checkers Simulator
D501	Heung Shing Bank
D502	Weather statistics
D503	Textual bar chart
D701	Queue
D702	Stack
D703	Linked list: representation
D704	Linked list: insertion
D705	Linked list: deletion
D706	Cyclic queue
D801	Binary search
D802	Bubble sort
D803	Insertion sort
D804	Selection Sort

SQL Exercises

ID	Task name
Q201	SELECT: Library collection
Q202	SELECT: Finding specific books
Q203	Operators: Computer inventory
Q204	Operators: Specialised computers
Q205	Operators: Term report
Q206	Order: Cake shop
Q207	Order: Hotel reservation
Q208	Aggregation: Sports Day (A.M.)
Q209	Aggregation: Sports Day (P.M.)
Q211	Operators: Mark Six
Q212	String: Scrabble
Q213	Dates: Travel log
Q301	Join: School lockers
Q302	Join: Scientific research grants
Q303	Join: Travel agency
Q311	NATURAL JOIN: Film studio
Q312	Self Join: Employee reporting chain
Q313	Self Join: Sports league
Q314	CROSS JOIN: Restaurant combos
Q351	Pokemon Types
Q401	Subqueries: Flight management
Q402	Subqueries: Blog post & comment analysis
Q403	Subqueries: Employee skill training
Q404	Subqueries: Playlist analysis
Q411	ANY: Competitive pricing
Q412	ALL: Car model comparisons
Q421	UNION ALL: Sales consolidation
Q422	Outer Join: Apartment rentals
Q423	INTERSECT: Festival analytics
Q424	EXCEPT: Forum user activity
Q501	Vending machine
Q502	Bus routes
Q503	Online shop product reviews
Q504	University course enrollment
Q505	Event ticketing system

Level C - Algorithms for HKOI

ID	Task name
C100	Giving changes
C101	Fractional Knapsack
C102	Giving changes II
C200	Partial Sum
C201	2D Partial Sum
C202	Difference Array
C203	Discretization
C204	Sliding Window
C300	Gift Distribution I
C301	Secret Array I
C302	Secret Array II
C303	Gift Distribution II
C400	Grid Walking
C401	Clear the String
C402	Stone Game
C403	Ball Collisions
C404	Sorting Subarrays
C500	Sliding Window Maximum
C501	Text Editor
C600	Happy String
C601	Happy Sum
C602	Sudoku Puzzle
C603	Median of Two Sorted Arrays
C700	Merging arrays
C701	Merging sub-arrays
C702	Merge sort
C703	Quick sort: partitioning
C704	Quick sort: analysis
C710	Counting sort
C711	Sorting with associated data
C712	Radix sort
C713	Case-insensitive string sorting
C750	Binary Search on Answer I
C751	Binary Search on Answer II
C800	Depth First Search
C801	Flood Fill
C802	Simple maze

Training Team Exercises

Task group	Tasks
Level B	20
Level A	30
Classics & UVa	123

Competition Problems

Task group	Tasks
Internal Competitions	
General Mini-competitions	293
Mini Competition 0	59
ICPC Mode (Teams)	99
Special Topics	49
Brain Teasers	30
Team Formation Test	107
Local Competitions	
HKOI Junior Group (2004~)	99
HKOI Senior Group (2004~)	96
HKGOI (2025/26~)	12
SDIC (CSP-J/S) & NOIP (2013~)	151
La Salle—Pui Ching Programming Challenge (2016~)	110
CityU HK Secondary Schools Coding Challenge (2022~)	42
External Competitions	
International Olympiad in Informatics	55
National Olympiad in Informatics	18
Asia-Pacific Informatics Olympiad	9
Other Competitions	4

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