

## Problem solving in C++ (Curriculum)

### File Input/Output ( File I/O)

- Standard I/O vs File I/O
- #include <fstream>
- Define handler for input file: ifstream
- Define handler for output file: ofstream
- Simple file I/O problem

### File processing problem

- Using **while** (infile>>x) to read all data **x** in a file
- Initialisation of variables (n, s, max and min) for counting, summing, finding maximum and minimum
- Counting statement  $n = n + 1$  or  $n++$
- Summing  $s = s + x$
- Finding maximum if (  $x > \text{max}$  )  $\text{max} = x$
- Finding minimum if (  $x < \text{min}$  )  $\text{min} = x$

### Soccer matches result problem

- Number of matches is given in a file
- Read the number of matches first
- Using **for** processing loop to read scores of all matches
- Using **if** statement to identify drawn matches and maximum score difference match
- Using absolute (**abs**) function to find positive difference between two scores
- Advanced soccer matches problem solving

### Numbers game

- Handling two different input files
- Using **for** loop to read a specific pairs of number
- Using **if** statement to decide a winning or losing number
- Perform counting for the number of winning or losing numbers
- Advanced number game problem which requires data validation

### Word processing problem

- Using **array** to store number of occurrence of word having same length
- Using **while** (infile>>word) to read each word in a text file
- Perform counting on number of word
- Using **strlen** function to check word end with punctuation
- Identify sentence and count number of sentences
- Store number of occurrence (same word length) in **array**
- Using **for** loop to display the number of occurrences for each word length

### Files merging

- The requirement of merging 2 lists of data: both lists must be in order
- Handling two different input files
- The merging algorithm
- Using High Value technique to simplify the algorithm

### Sorting (Bubble Sort)

- See how bubble sort works by example
- Using **array** to store the data items, sort data items in **array**
- Concept of passes
- Swapping of two data items when there are not in order
- Two nested **for** loops required: for passes and swapping
- List the sorted data items using **for** loop

### Miscellaneous problems

- Computer generate a random number and the user try to guess it
- The user think of a number and the computer try to guess it
- Breaking a 3-digit code generated by the computer