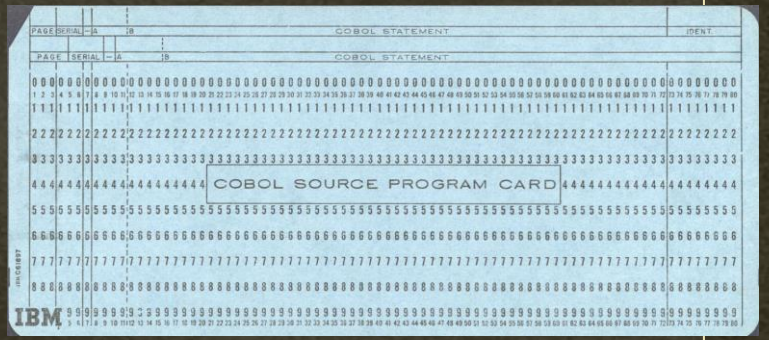
COBOL Bubble Sort

- Common Business Oriented Language
- Compiled
- Statically Typed
- Created in 1959 as part of a DoD effort to create a portable data processing language



800,000,000,000

Lines of COBOL code still in use

```cobol
IDENTIFICATION DIVISION.
PROGRAM-ID. "SORT".

ENVIRONMENT DIVISION.
    INPUT-OUTPUT SECTION.
        FILE-CONTROL.
        SELECT ARRVALUES ASSIGN TO 'py_vs_X_assign2.txt'
        ORGANIZATION IS LINE SEQUENTIAL.

DATA DIVISION.
    FILE SECTION.
    FD ARRVALUES.
    01 ARR-FILE.
        05 ARR-VALUE PIC 9(6).

    WORKING-STORAGE SECTION.
    01 ARR PIC S9(6) OCCURS 500000 TIMES INDEXED BY ARRINDEX.
    01 ARRAYSIZE PIC 9(6) VALUE 1.
    01 TEMP PIC 9(6) VALUE 000.
    01 I PIC 9999 VALUE 0.
    01 J PIC 9999 VALUE 1.
    01 WS-ARRVALUES.
        05 WS-NUMVALUE PIC 9(6).
    01 WS-EOF PIC A(1).

PROCEDURE DIVISION.
    OPEN INPUT ARRVALUES.
    PERFORM UNTIL WS-EOF = 'Y'
        READ ARRVALUES INTO WS-NUMVALUE
        AT END MOVE 'Y' TO WS-EOF
        NOT AT END
            MOVE WS-NUMVALUE TO ARR(ARRAYSIZE)
            ADD 1 TO ARRAYSIZE
    end-read
    end-perform.
    CLOSE ARRVALUES.
```

```cobol
* Bubble sort method.
    MOVE 1 TO I.
    PERFORM UNTIL I > ARRAYSIZE
    MOVE I TO J
        PERFORM UNTIL J > ARRAYSIZE
          IF (ARR(I) < ARR(J))
            MOVE ARR(J) TO TEMP
            MOVE ARR(I) TO ARR(J)
            MOVE TEMP TO ARR(I)
          END-IF
        ADD 1 TO J GIVING J
        END-PERFORM
    ADD 1 TO I GIVING I
    END-PERFORM.

    DISPLAY "AFTER SORTING:"
    MOVE 0 TO I.
    PERFORM UNTIL I = 100
    ADD 1 TO I
    DISPLAY  ARR(I)
    END-PERFORM.

STOP RUN.
END PROGRAM SORT.
```

COBOL programs are divided into four divisions, Identification, Environment, Data, and the Procedure Division.

RESULTS

Sorting an array of size n = 500,000...

Python Runtime: 4 Hours

COBOL Runtime: At least twice that

Preferred Language for future projects: C#