CSCI 3180 Assignment 1 Report

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1. The conveniences and difficulties in FORTRAN and COBOL

In "Variable" part, it is convenient to build a complete and clear data structure by COBOL Data layout. For example, the employees information. We can use these data in different requirement easily, like displaying employees' surname only or all information in one line.

COBOL

```
000000 FD EM-FILE.
000000 01 EMPLOYEES-RECORD.
000000     05 EM-ID PIC 9(4).
000000     05 EM-NAME.
000000         10 SURNAME PIC X(10).
000000         10 FIRST-NAME PIC X(20).
(…)
```

In "Reading file in certain format" part, it is convenient to associates different type of file in COBOL. We can set the required file organization, access mode, and file status in "FILE CONTROL". And we can declare data layout for this file. When we read it, it will automatically save into the data layout. We don't need to define where the data put in.

COBOL

```
000000 FD EM-FILE.
000000 01 EMPLOYEES-RECORD.
000000     05 EM-ID PIC 9(4).
(…)
000000     READ EM-FILE
```

But in FORTRAN, we need to define where the data put in for each time.

FORTRAN

```
25 FORMAT(I4,A10,A20,A1,A10,A10,A3,A6)
50 READ(EMFILE ,25, IOSTAT = EMIO) EM_ID, EM_SN
  $, EM_FN, EM_GEN, EM_BD, EM_HD, EM_DP, EM_SL
```

In "Computation" part, it is more convenient to calculate in FORTRAN. You can finish it in a few line. But it can't in COBOL.

COBOL

```
000000 SUBTRACT 10 FROM SORTED-HOUR GIVING TMP-LATE-TIME
000000 MULTIPLY TMP-LATE-TIME BY 60 GIVING TMP-LATE-TIME
000000 ADD SORTED-MINUTE TO TMP-LATE-TIME
000000 DIVIDE 15 INTO TMP-LATE-TIME GIVING TMP-LATE-TIME
```

FORTRAN

```
      HR = HR - 10
      MI = MI + HR*60
      CHECKLATE = MI/15
      END
```

In conclusion, we can see COBOL is totally for data processing, and FORTRAN is for scientific, mathematical and engineering usage, same as their name (COBOL: Common Business-Oriented Language FORTRAN: Formula Translation).

2. Compare FORTRAN and COBOL with modern programming languages

FORTRAN, COBOL and C are Imperative programming paradigms, run on sequential order. FORTRAN and C have a similar data type declaration, and we can declare a data type with a fixed storage size, like 4 bytes of integer. But COBOL is different that we need to declare the length of data size, like "`05 MT-YEAR PIC 9999.`"

And the most different part with C and these two language is Column Specification. COBOL and FORTRAN are structured code with complex column specification, even have a limited column in length of each line. But the modern programming languages are not.

3. The functionality of each submodule and the main flow

Open File -> Read date record -> Print heading -> Read one employee record -> Find record -> Check Status -> Calculate -> Print this employee record -> Repeat until employee file EOF-> Print bottom in summary -> End program

a) We first read date record and print heading on summary and monthly-attendance

b) Find record: find the employee's one arrive and one leave record

c) Check Status: check the status of each employee, whether present/absent/late/suspicious

d) Calculate: calculate absent, OT and late time of each employee

e) When we finished calculating, we will print the required record of each employee