Ch8-10 Review

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CMPT14x
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Reminders:

- ***journals** in folder*
- *Elec. **dictionary** was lost in this room*
  last Fri: claim in office

Review of last time (11.4-11.9)

- Paper topics:
  - Choose case-studies for evidence to support your thesis
  - Make sure your main point (thesis) is very clear
  - Visit the Writing Centre in Douglas 2nd floor
- Constructors: Type { list }
  - Set constructors
  - Array constructors
  - Record constructors
- Variant records

Key concepts, ch8-10

- Chapter 8: Data Storage
  - Base 2/8/10/16, program memory, CAST
  - Files: sequential streams, rewindable, random
- Chapter 9: Structured Data Types
  - Sets, records
- Chapter 10: Program structuring
  - Scope: local modules, IMPORT/EXPORT
  - Generalized LOOP and EXIT
  - Termination: HALT, FINALLY
  - Exceptions

Summary from (8.1-8.2)

- Number bases:
  - Binary
  - Hexadecimal (0BEEFH)
  - Octal (115B)
    - Defining characters with octal: 115C
- Units of measure of memory:
  - Bits, nibbles, bytes, words, pages
- Units of measure for hard disks:
  - C/H/S geometry
- SI units vs binary units, KB vs. Kb, etc.

Summary from (8.3-8.6)

- SYSTEM module
  - LOC, ADDRESS, ADR, CAST (vs. VAL)
  - M2 variables pointing to specific memory
- Files:
  - Logical/program/physical files
  - text/binary streams, channels
- Sequential streams: StreamFile, *IO libraries
- Rewindable streams: SeqFile, *IO libraries
  - Reread and Rewrite
  - File modes: read/write/old

Summary from (8.6-8.12)

- Sequential streams: StreamFile driver
  - StringIO, WholeIO, RealIO libraries
- Rewindable streams: SeqFile driver
  - Reread and Rewrite
  - File modes: read/write/old
- Binary streams: RawIO driver
- Standard Channels (StdInChan, StdOutChan)
- Low-level device-independent I/O: IOChan
    - (just be aware that StreamFile/SeqFile/etc. use IOChan for even lower-level stuff)

Quiz ch8 (7 questions, 20 marks, 10 minutes)

- Convert 1101 1011 from binary to hexadecimal.
- If 101C = 'A', what is 110C?
- Express 110C using the CHR() notation.
- Express 2Mb/sec in bytes/sec.
  - (you may express your answer in powers of 2)
- In your own words, describe the difference between CAST and VAL.
- What M2 type do data storage units have, and in what library is this type found?
- What M2 library is used to open/close rewindable sequential text streams?

Summary from (9.1-9.6)

- Using sets
  - Defining a set type
  - Declaring a set variable
  - Constructing a set
- Operations with sets
  - Set operations: IN, +, *, -, /
  - INCL/EXCL
  - Set comparisons: =, <>, >=, <=
- Bitsets and packed sets

Summary from (9.7-9.10)

- Records
  - Defining record types
  - Fields
  - Initializing record variables
  - WITH
- Using records and arrays
  - Example: Class of students
- Output of aggregate data

Summary from (9.11-10.4)

- RndFile: random-access files
  - OpenOld/OpenClean, NewPos/SetPos
- Scope, visibility, blocks
- Rules of thumb about variables/parameters
- Procedure variables

Quiz ch9: 4 questions, 20 marks, 10 minutes

```
TYPE mySet = SET OF [0 .. 10];
VAR a, b : mySet;
a := mySet {1, 2, 9, 10};
b := mySet {2, 4, 6, 8, 10};
```

- Evaluate these two expressions: a*b, a/b
- Create a list of 100 points: each point has (x,y,z) coordinates (REAL) and (r,g,b) colors (CHAR)
  - Be sure to declare any types you may need
- How would you determine how many LOCs are used to store the above list of points?
- Name the 3 standard I/O libraries used to open/close files, and the differences among them
  - Hint: they contain e.g., Open, OpenRead, OpenOld

Summary from (10.5-10.11)

- Local modules
- Import and export of items from modules
- Qualified export

- General LOOP and EXIT
- RETURN
- HALT (vs. RETURN?)
- FINALLY

Summary from (10.12)

- Exceptions: another level of error handling
  - Raise/handle (a.k.a. throw/catch)
  - EXCEPT clause:
    - Do nothing, RETURN, RETRY
  - Built-in exceptions: M2EXCEPTION:
    - M2Exceptions, IsM2Exception(), M2Exception()
  - Standard library exceptions: e.g., IOChan:
    - ChanExceptions, IsChanException(),ChanException()
  - User defined exceptions: how to raise/handle
  - Exceptions and termination

Quiz ch10: 5 questions, 20 marks, 10 min

- What keyword delimits a termination clause?
- Describe all the differences between HALT and RETURN
- What are the 3 steps needed to define and throw your own exception?
- For each module (Child1, Child2, Parent) on the next page, name all visible variables.
- Write a complete module that throws a wholeDivException exception and handles it
  - Hint: use M2Exceptions, IsM2Exception(), M2Exception() in the M2EXCEPTION library

Quiz ch10 answers: #4 [5]

```
MODULE Parent;
VAR pvar: REAL;
MODULE Child1;
    EXPORT c1var;
    VAR c1var: REAL;
END Child1;

MODULE Child2;
    IMPORT Child1;
    VAR c2var: REAL;
END Child2;

END Parent.
```

Visible in Child1:
c1var

Visible in Child2:
c1var (aka Child1.c1var),
c2var

Visible in Parent:
c1var (aka Child1.c1var)
pvar

Quiz ch10 answers: #5

- Throw wholeDivException and handle it:

```
MODULE ExceptionExample;
FROM M2EXCEPTION IMPORT
    M2Exceptions, M2Exception, IsM2Exception;
VAR myInt : INTEGER;
BEGIN
    myInt := 5 / 0;          (* throws wholeDivException *)
EXCEPT
    IF IsM2Exception() AND
        (M2Exception() = wholeDivException) THEN
        (* could do more here *)
        RETURN;
    END;
END ExceptionExample;
```

TODO items

- Lab #9 today/tomorrow/Wed: 10.15 #(44 / 49)
- Midterm ch8-10 Wed!
- Reading: through §12.5 for Thu

- Get cracking on your paper!