§2.8, 2.9, 2.11: Output

devo

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Reminders:

*1) **journals** in folder*
*2) **HW** by lab section*

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http://cmpt14x.seanho.com/

Review of 2.6, 2.7, 2.9, 2.10

- Literals
- Constants (how to initialize?)
- Operators on CARDINAL/INTEGERs
  - /, DIV, REM, MOD
- Operators on REALs
- Operator precedence
- Type conversions among CARDINAL, INTEGER, REAL:
  - VAL, FLOAT, TRUNC, INT

What's on for today (2.9, 2.9, 2.11)

- Formatted output of CARDINALs and INTEGERs
- Formatted output of REALs
- Summary of all I/O subroutines we know so far
- Interactive vs. batch programs

Output of CARDINALs, INTEGERs

- WriteCard, WriteInt: import from SWholeIO library
- WriteCard (15, 0); -----> outputs: "15"
- The second argument is the field width:
  - WriteInt (-24, 5); -----> outputs: " -24"
  - Output is padded with spaces to take up 5 characters total, including numbers and minus sign
- This lets you format your output according to columns or a table

Output of REALs

- I/O for REALs is in a different library: SRealIO
- WriteReal (real, width) uses significant figures:
  - WriteReal (-2.3, 6); ----> "-2.300"
  - (6 characters total, including "-" and ".")
  - Width 0 uses default format: " -2.30000E+00"

- Three more functions for REAL output:
  - WriteFloat (real, sigFigs, width);
  - WriteEng (real, sigFigs, width);
  - WriteFixed (real, place, width);

WriteFloat

- WriteFloat (real, sigFigs, width):
  - Uses given number of significant figures
  - Pads with leading spaces to specified width
  - WriteFloat (-23.461, 3, 10);

    ----> " -2.35E+01" (padded with one space)

WriteEng

- WriteEng (real, sigFigs, width):
  - Engineering notation:
    exponents are multiples of 3
  - Pads with leading spaces to fill width
  - WriteEng (-23461.4, 3, 10);

    ----> " -23.5E+03" (padded with one space)

WriteFixed

- WriteFixed (real, place, width):
  - Fixed-point notation
  - place specifies number of figures after decimal point
  - Pads with leading spaces to fill width
  - WriteFixed (-2.34684, 3, 8);

    ----> " -2.347" (padded with two spaces)

Summary of I/O routines we know

- From STextIO:
  - ReadChar (char);
  - WriteChar (char);
  - WriteString (string);
- From SWholeIO:
  - ReadInt (int);
  - ReadCard (card);
  - WriteInt (int, width);
  - WriteCard (card, width);
- From SRealIO:
  - ReadReal (real);
  - WriteReal (real, width);
  - WriteFloat (real, sigFigs, width)
  - WriteEng (real, sigFigs, width)
  - WriteFixed (real, place, width);

Interactive vs. batch programs

- Interactive programs use input and output to exchange data with the user
  - User interface: text-based or GUI
  - Good GUI design is a big topic
- Batch programs do not require any user intervention
  - The program knows how to get all the data it needs without asking the user
- Frequently, interactive programs can be batched by scripting canned user responses
  - Input from a script file instead of from user

Summary of today (2.9, 2.9, 2.11)

- Formatted output of CARDINALs, INTEGERs:
  - WriteCard (card, width); WriteInt (int, width);
- Formatted output of REALs:
  - WriteReal (real, width);
  - WriteFloat (real, sigFigs, width);
  - WriteEng (real, sigFigs, width);
  - WriteFixed (real, places, width);
- Interactive vs. batch programs
  - Scripting an interactive program

TODO items

- Homework due Fri: §2.14 # 43
- Lab2 due next MWF: §3.14 # (38 / 45)
  - Choose either #38 or #45
  - Short writeup okay
- Reading: through §2.12 for Thu, §3.4 for Fri