
Module 3b: Compound Data

CPSC 110

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Module 3b: Compound Data

- Be able to identify domain information that should be represented as compound data.
- Be able to read and write define-struct definitions.
- Be able to design functions that consume and/or produce compound data.
- Be able to design world programs that use compound world state.

Notes

- **define-struct:** defines four general definitions
 - Definitions:
 - * the **struct** itself
 - * **constructor:** make-<struct-name>
 - * **selector(s):** <struct-name>-<field-name>
 - A unique selector is created for each field name
 - * **predicate:** <struct-name>?
 - (define <struct-name> (x y))
 - * x and y have given this struct two field names
 - Define a <struct-name> struct using:
 - * (define S1 (<struct-name> x y))
 - * x and y set values for the field names

Data definition example:

```
(@HtDD Movie)
(define-struct movie (title budget year))
;; Movie is (make-movie String Natural Natural)
;; interp. metadata for a movie
;;          title is the movie's title
;;          budget is the movie's production budget
;;          year is the year the movie was released
(define M-TITANTIC (make-movie "Titanic" 200000000 1997))
(define M-ELEMENT (make-movie "The Fifth Element" 90000000 1997))
(define M-AVATAR (make-movie "Avatar" 237000000 2009))
(define M-AVENGERS (make-movie "The Avengers" 220000000 2012))

(@dd-template-rules compound)
(define (fn-for-movie m)
  (... (movie-title m) ; String
```

```
(movie-budget m)    ; Natural
(movie-year m))    ; Natural
```

and a function implementing Movie:

```
(@HtDF budget?)
(@signature Movie -> Boolean)
;; produce true if movie's budget is < 100 000 000 (USD)
(check-expect (budget? M-TITANTIC) false)
(check-expect (budget? M-ELEMENT) true)
(check-expect (budget? (make-movie "Moonrise Kingdom"
                                   160000000
                                   2012))
              true)

;(define (budget? m) false) ; stub

(@template Movie)
(define (budget? m)
  (< (movie-budget m)
     100000000))
```

Terminology