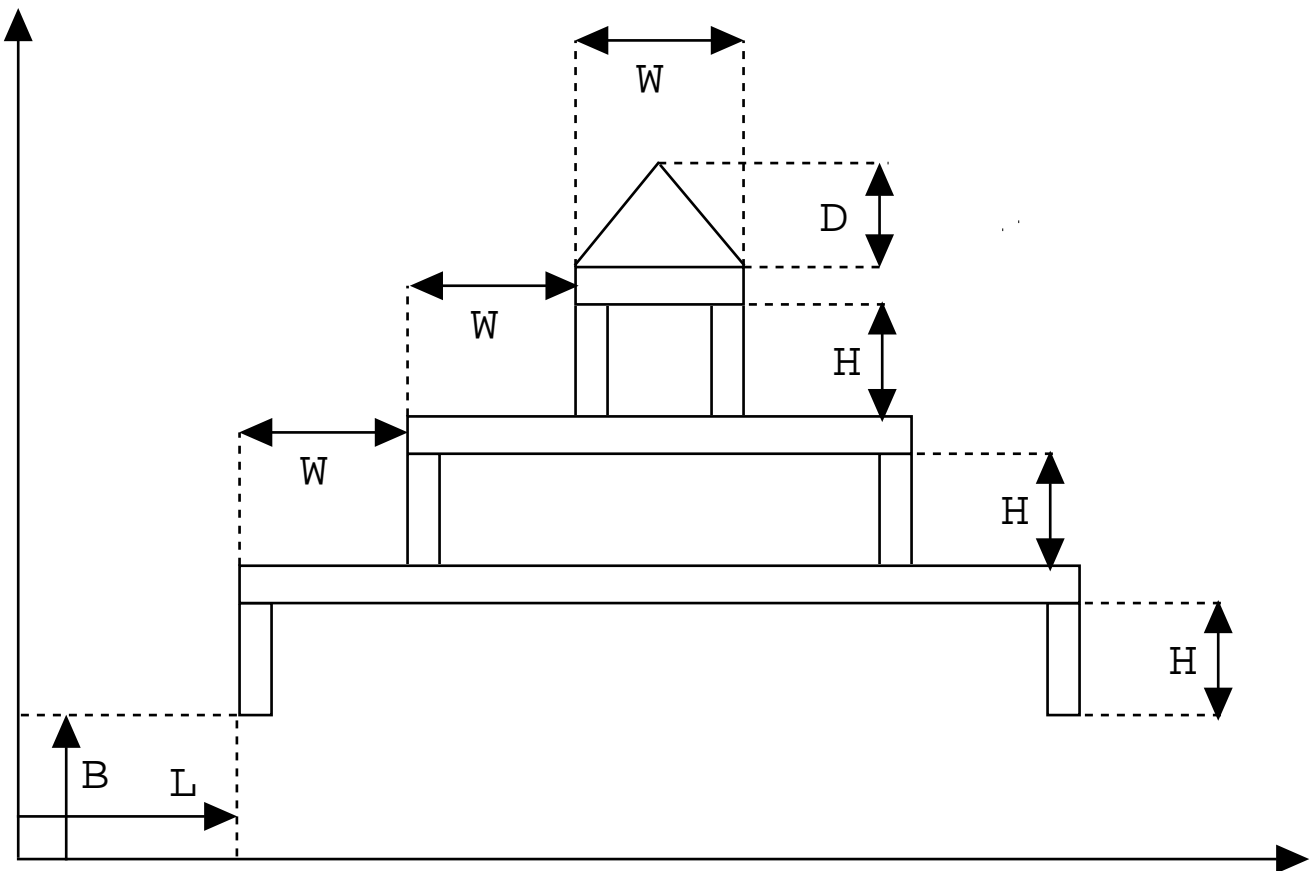


CS 101 Computer Science I (Fall 2001)
Assignment 6

In this assignment you will use your knowledge of data abstraction and recursion in a simple computer graphics application. We will provide you with a file called “cs101-graphics.scm”. This file contains a collection of Scheme procedures for drawing pictures of triangles, rectangles, houses and towers. Your job is to extend this program so that it can draw a picture of a pyramid composed of several arches and a triangle, similar to the one shown below. Your solution should use one of the two arch data type implementations that you wrote in the lab for this week. In addition, you must also implement each of the pyramid constructor and selector functions that are described below. Once you have implemented these functions, you can use the procedure called “draw-object” to draw your pyramid. You should test your implementation of the pyramid data type by evaluating the two expressions for building and drawing a pyramid that appear at the end of the file cs101-graphics.scm.



Pyramid Constructor and Selector Functions

- **build-pyramid** takes seven integers (N L B W H T D) as input: The number (n) of arches in the pyramid; the horizontal coordinate (L) of the left side of the arch at the bottom of the pyramid; the vertical coordinate (B) of the bottom of the arch at the bottom of the pyramid; the width (W) of the arch at the top of the pyramid, the height (H) of all the arches in the pyramid, the thickness (T) of all the arches in the pyramid, and the vertical dimension (D) of the triangle on the top of the pyramid. Your **build-pyramid** function should call **make-pyramid** with appropriate arguments to create the pyramid datum.

- `make-pyramid` takes as inputs the data that implement the pyramid. This function simply packages the data into a list structure along with a symbol indicating the pyramid data type.
- `pyramid-roof` takes a pyramid as input and returns the triangle on the top of the pyramid.
- `pyramid-base` takes a pyramid as input and returns a list of the arches that compose the layers of the pyramid.
- `pyramid?` takes any input and returns `#t` if the input is a pyramid and returns `#f` otherwise.

Due Dates

- Section 51 (Professor Welty): Friday, March 9, 2001
- Section 52 (Professor Ellman): Friday, March 9, 2001