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-- CS 410W
-- Fall 2014
-- This program is a simple demonstration of the Ada programming language.  The
-- user is prompted for a positive integer.  Then, a series of stars is printed
-- recursively to the screen based on the number the user entered.

with Ada.Text_IO; use Ada.Text_IO;
with Ada.Integer_Text_IO; use Ada.Integer_Text_IO;
with Ada.IO_Exceptions; use Ada.IO_Exceptions;
with Ada.Strings.Unbounded; use Ada.Strings.Unbounded;

-- Name: main
-- Input: N/A
-- Purpose: This procedure is the main entrypoint for the program.
-- Output: The results from the printLines procedure
procedure hello is

   num : Integer;

   -- Name: printLines
   -- Input: num is an Integer specifying the maximum number of stars printed
   -- Purpose: This procedure recursively prints a number of lines in the
   --     following format. For example, given num = 3:
   --     ***
   --     **
   --     *
   --     **
   --     ***
   -- Output: A series of stars recursively printed to the screen
   procedure printLines (num : in Integer) is

      stars : Unbounded_String;

   begin

      -- Recursion stopping condition
      if num = 0 then

         return;

      end if;

      -- Create string of stars
      for i in Integer range 1 .. num loop

         Append(stars, "*");

      end loop;

      -- Recursively output the strings of stars
      declare
         output : constant String := To_String(stars);

      begin

         Put_Line(output);

         -- Print one star only once
         if num /= 1 then

            printLines(num - 1);
            Put_Line(output);

         end if;

      end;

   -- Exception handlers
   exception
      when Ada.Strings.Length_Error => Put_Line("Error while printing stars!");

   end printLines;

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-- Main entrypoint
begin

   Put_Line("Enter a positive integer: ");
   Get(num);

   -- Make sure num is nonnegative (can be achieved in other ways, too)
   if num < 0 then

      raise Ada.IO_Exceptions.Data_Error;

   end if;

   Put_Line("Output for num = " & Integer'Image(num));
   printLines(num);

   -- "Pause" the program
   delay 5.0;

-- Exception handlers
exception
   when Ada.IO_Exceptions.Data_Error => Put_Line("Invalid input!");

end hello;


```