## **Programming Assignment 1: Draw House**

In this assignment you will design and draw the front view of a one-story house. The house roof is an isosceles trapezoid. The house has two windows and an entrance door at the center near the floor. The body of the house is represented as a rectangle. The two windows are located at two sides of the door.



The width of the roof top is r\_top of value between 10 and 20. The isosceles side of the roof, between the roof top and bottom, is r side of value between 10 and 25. Hence, the width of the roof bottom r bottom is r top+2\*r side. The boundary points of the roof are marked using '@' and the interior points are marked using '\*'. The width of the house body, not including the wall, is h width and the height, not including the floor, is h height. Let us assume the thickness of each wall and the floor is 2 and they are marked using '%' The value of h\_width must be less than r bottom-4 and h height is less than or equal to h width. The values of r bottom and h width must be both even or both odd. The top position of the windows and the door is 4 points apart from the roof bottom (ceiling) and the wall. A window is a 3×2 grid. The frame and the horizontal grid line of the window are marked using '=', the vertical grid lines are marked using '+', and the glass of window is of size 3×3 marked using ''. The horizontal space between a window and the door is 2 points and the space between the low end of the door and the floor is 2 points. Calculate the size of the door. Verify the size of the door is at least of 12 points wide and 16 points high; otherwise, the house design is invalid. Use '@' to mark the points of the door. Write a C program to show the design of the house and draw a house of your design.

Write comments in your program solution as much detailed as possible. Also, write a report to explain your design of the house and the working experience of your program solution such as the process how you develop your house design and problems you encounter. Homework assignment 1 is due by 11:59 pm, Sunday, October 1. Use assgn1\_DXXXXXXXX.c for your source code file and assgn1\_DXXXXXXX.pdf for your report. where DXXXXXXXX is your student ID. Submit the source code and the report to iLearn.

Example of program execution: (in the next page)

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Enter the width of the roof top (10 to 20): 16
  Enter the isosceles side of the roof (10 to 25): 16
  The width of the roof bottom r bottom is r_top+2*r_side 48.

Enter the width of the house (<44 and (r_bottom, h_width) both even or odd): 42

Enter the height of the house (<42): 26
***** Design parameters of the house:
   The top of the roof: 16
     The side of the roof: 16
The bottom of the roof: 48
     The width of the house: 42
  >>> The height of the house: 26
     The width of the window: 9
     The height of the window: 13 The width of the door: 16
     The height of the door: 18
     The space from the window/door to the ceiling: 6
     The space from the window to the wall: 2 The space between the window and the door: 2
  <><< The space between the floor and the door: 6
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