**CPP Problem Design**

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| **Subject: Simple Drawing Program** |
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| **Main testing concept: 2-Dimension Array**   |  |  | | --- | --- | | **Basics** | **Functions** | | □ C++ BASICS  □ FLOW OF CONTROL  □ FUNCTION BASICS  □ PARAMETERS AND OVERLOADING  ■ ARRAYS  □ STRUCTURES AND CLASSES  □ CONSTRUCTORS AND OTHER TOOLS  □ OPERATOR OVERLOADING, FRIENDS,AND REFERENCES  □ STRINGS  □ POINTERS AND DYNAMIC ARRAYS | □ SEPARATE COMPILATION AND NAMESPACES  □ STREAMS AND FILE I/O  □ RECURSION  □ INHERITANCE  □ POLYMORPHISM AND VIRTUAL FUNCTIONS  □ TEMPLATES  □ LINKED DATA STRUCTURES  □ EXCEPTION HANDLING  □ STANDARD TEMPLATE LIBRARY  □ PATTERNS AND UML | |
| **Description:**  Please design a simple drawing program (fill the background with \*), allow users to draw square, Isosceles right triangle and lines on the console (for figure, fill with Upper X)  **Input:**  At the beginning, allow users to enter the size of the drawing board(m\*n).After that, enter the corresponding drawing code. S indicates square, T indicates Isosceles right triangle, L indicates lines. According to different figures, there follows various input information:  S: input integer width(the width of the square). And coord x,y, drawing will start from x,y(calculates from the left-up corner of the square).  T: input integer width(the side-length of the triangle). And coord x,y and the side the triangle faces. Which are respectively LU(Left Up),LD(Left Down),RU(Right Up),RD(Right Down).While drawing, the x,y indicates the position of right angle.  L: input two pairs of coord x1,y1 & x2,y2.Drawing from x1,y1 to x2,y2 (Except straight line, it would possible be tilted lines with +-45 Angle).  Enter EXIT,end the program.    ※Please notice the coordinate, the left-up corner is 0,0 while right-down corner is m-1,n-1.  ※If the following figure violates the border of drawing board,please output  “Out of range.”.And there no need to modify the board.  ※Notice that for any figure,if the given width is 1 you’ll need to draw a point.  ※You need to output a result every draw,separates each with a line of space.  ※Expect the test data testing border violation, we ensure all input data is drawable.  ※Any operation about string,please implements with std::string,or not points will be given.  **Output:**  After drawing a figure or an error message,output a newline.  **Sample Input / Output：**   |  |  | | --- | --- | | Sample Input | Sample Output | | 5 6  S  2  0 0  S  2  100 100  L  0 4 4 4  T  2  1 3  LU  EXIT | XX\*\*\*  XX\*\*\*  \*\*\*\*\*  \*\*\*\*\*  \*\*\*\*\*  \*\*\*\*\*  Out of range.  XX\*\*\*  XX\*\*\*  \*\*\*\*\*  \*\*\*\*\*  XXXXX  \*\*\*\*\*  XX\*\*\*  XX\*\*\*  \*X\*\*\*  XX\*\*\*  XXXXX  \*\*\*\*\* | |
| **□ Eazy,Only basic programming syntax and structure are required.**  **■ Medium,Multiple programming grammars and structures are required.**  **□ Hard,Need to use multiple program structures or more complex data types.** |
| **Expected solving time:**  30 minutes |
| **Other notes:** |