**Bluebeam Software, Inc.**

**Engineering Technical Exercise**

Description:

You are asked to write a command line program in C# that takes a maze image as input and solves the maze and writes it to an output image. Please see the attached sample maze inputs. Note that the samples do not represent all types of mazes that your solution if expected to solve. The syntax of the program must be:

maze.exe “source.[bmp,png,jpg]” “destination.[bmp,png,jpg]”

Rules:

1. Start at Red
2. Finish at Blue
3. All walls are black
4. Maze is surrounded by black walls
5. Draw the solution on the image in green

Considerations:

We will be looking for the following in your solution:

* Code that is fully original
* Code that is in accordance with SOLID principals considering testability and extensibility in your choice of code organization and design patterns.  Some examples of unit testing should be provided.
* Code that is efficient in both memory and CPU utilization
* Code that is easy to understand and maintainable
* Code that handles various real-world scenarios (non-orthogonal mazes, bad files, etc.).

Deliverables:

E-mail a .zip file containing the full source directory of the program including the project and solution files to me ([ctanous@bluebeam.com](mailto:laura.marks@bluebeam.com)).

Notes:

There is a freely available Community version of Visual Studio available at [https://www.visualstudio.com/post-download-vs?sku=community](https://www.visualstudio.com/post-download-vs?sku=community&clcid=0x409&downloadrename=true)

Also, if you are less familiar with Visual Studio, feel free to use <http://monodevelop.com/> to assist with the exercise.

**Questions for Bluebeam:**

1. Will I always get a maze image with black, white, red and blue pixels?
2. Will there be any input where the maze won’t be completely surrounded by black walls?
3. What is the minimum pixel thickness of the maze passage through which I need to pass?
4. How many pixels thick should the Green path line be?
5. Where should I take the following input: maze.exe “source.[bmp,png,jpg]” “destination.[bmp,png,jpg]”
   1. On my Console application window or
   2. On the Microsoft windows Command prompt (provided I am on the correct application directory)?
6. destination.[bmp,png,jpg] means
   1. The output file should be in any of the bmp, png or jpg format or
   2. There should be three output files namely destination.bmp, destination.png and destination.jpg?
7. Will the Source and destination images be present within the Solution folder?

**Questions for Bluebeam:**

1. Create unit tests.
2. Exception handling for non-orthogonal mazes and bad files
3. Check command prompt working