

Diamonds are a Girl's Best Friend



<http://www.fablicious.com/immortal-marilyn/marilyn-diamonds-are-a-girls-best-friend/>

Objectives:

- Gain experience with loops
- Gain experience with replacing the default new line character in the print statement

Problem Statement:

Write a program that will draw a diamond-shaped picture. Prompt the user to input the number of lines to be drawn. *Note: in order to form the diamond shape, the number of lines must be an odd number in this program.*

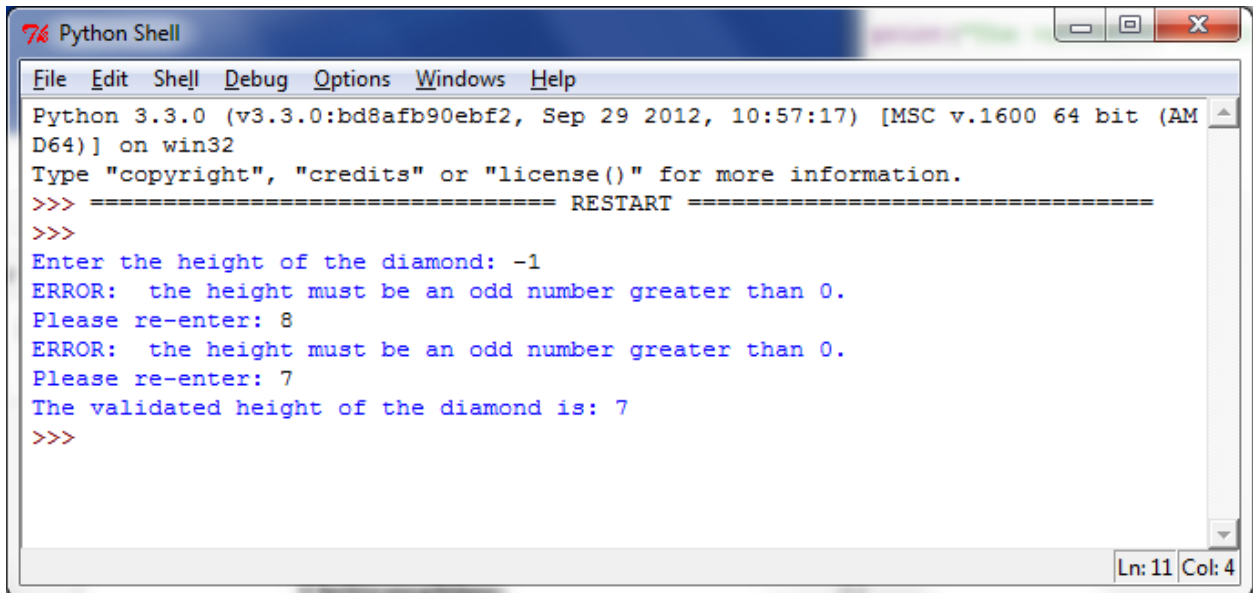
Your program needs to check whether the number of lines is valid. If it is not valid, you need to prompt the user to give you a new number and validate it as well.

You may use output statements that print either a single asterisk (*) or a single space. If you forget to replace the default new line character that is automatically added to Python print statements, everything will be printed in a long vertical line on the screen. You will definitely need to use loops, but it is your choice whether to use a `while` loop or a `for` loop.

Instructions:

Stage 1:

Start by validating the height (number of lines) of the diamond.

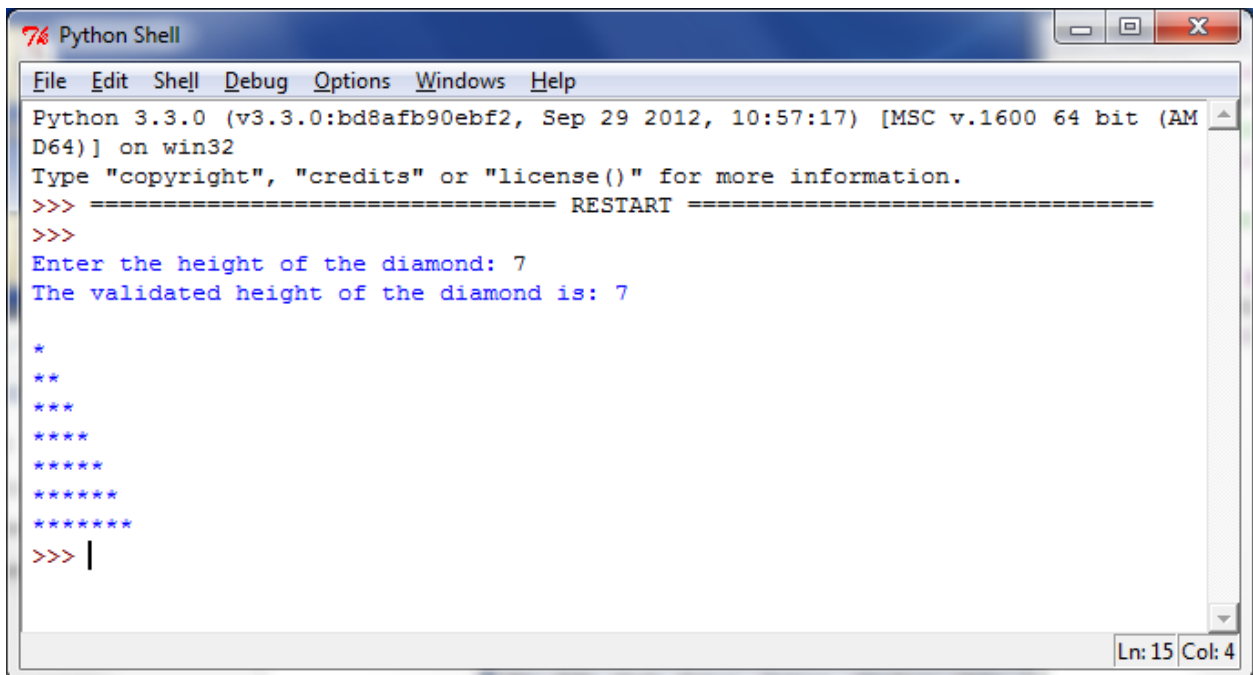
A screenshot of a Python Shell window titled 'Python Shell'. The window has a menu bar with 'File', 'Edit', 'Shell', 'Debug', 'Options', 'Windows', and 'Help'. The main text area shows the following text:

```
Python 3.3.0 (v3.3.0:bd8afb90ebf2, Sep 29 2012, 10:57:17) [MSC v.1600 64 bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> ===== RESTART =====
>>>
Enter the height of the diamond: -1
ERROR: the height must be an odd number greater than 0.
Please re-enter: 8
ERROR: the height must be an odd number greater than 0.
Please re-enter: 7
The validated height of the diamond is: 7
>>>
```

The status bar at the bottom right shows 'Ln: 11 Col: 4'.

Stage 2:

With a validated height, you can then start to work on printing the diamond. Start by printing 1 asterisk on the first line, 2 on the second line, etc. until the last line has the same number of diamonds as the height.

A screenshot of a Python Shell window titled 'Python Shell'. The window has a menu bar with 'File', 'Edit', 'Shell', 'Debug', 'Options', 'Windows', and 'Help'. The main text area shows the following text:

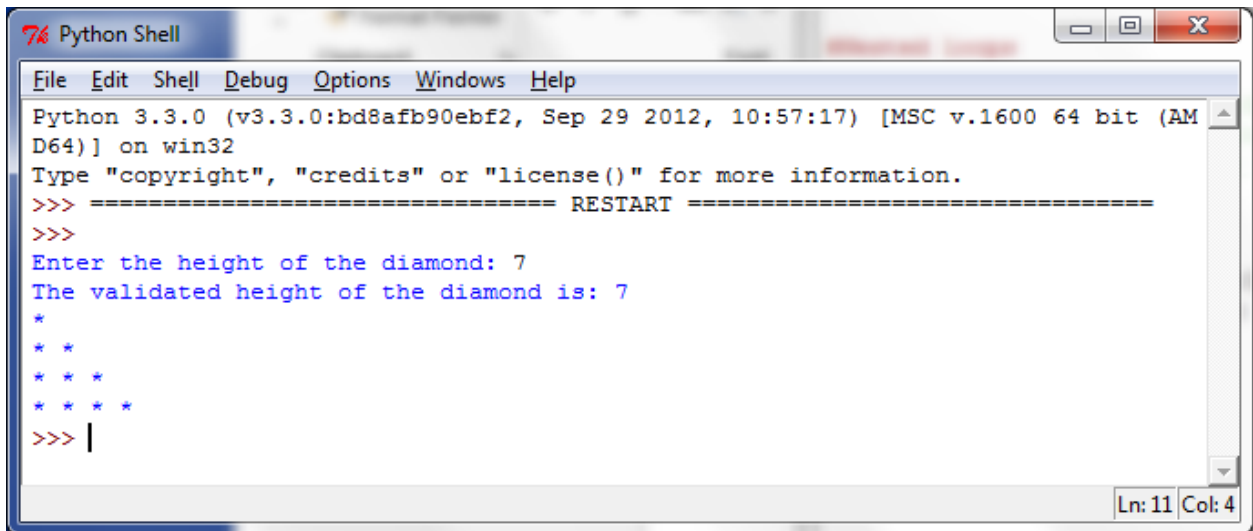
```
Python 3.3.0 (v3.3.0:bd8afb90ebf2, Sep 29 2012, 10:57:17) [MSC v.1600 64 bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> ===== RESTART =====
>>>
Enter the height of the diamond: 7
The validated height of the diamond is: 7

*
**
***
****
*****
*****
*****
>>> |
```

The status bar at the bottom right shows 'Ln: 15 Col: 4'.

Stage 3:

Now print half + 1 of the rows and put a space between each of the asterisks.

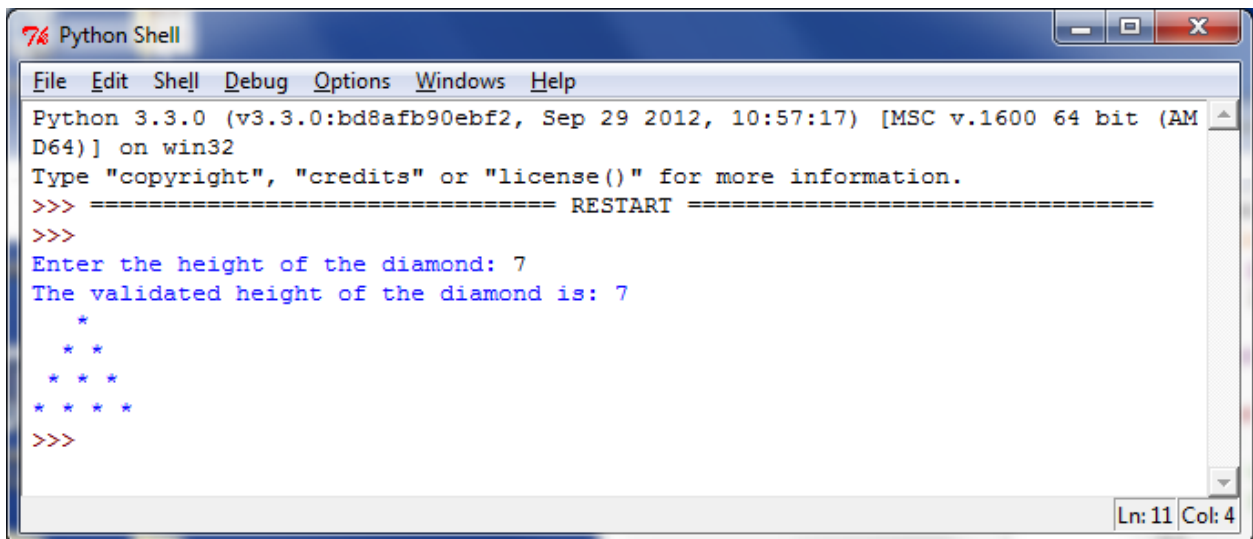


A screenshot of a Python Shell window titled "Python Shell". The window has a menu bar with "File", "Edit", "Shell", "Debug", "Options", "Windows", and "Help". The main text area shows the following content: "Python 3.3.0 (v3.3.0:bd8afb90ebf2, Sep 29 2012, 10:57:17) [MSC v.1600 64 bit (AMD64)] on win32", "Type 'copyright', 'credits' or 'license()' for more information.", and a prompt ">>> ===== RESTART =====". Below this, the user has entered "Enter the height of the diamond: 7" and the shell has responded "The validated height of the diamond is: 7". The user has then entered a prompt ">>> |" and the shell has printed a diamond pattern of asterisks: a single asterisk on the first line, two on the second, three on the third, and four on the fourth. The status bar at the bottom right shows "Ln: 11 Col: 4".

```
Python 3.3.0 (v3.3.0:bd8afb90ebf2, Sep 29 2012, 10:57:17) [MSC v.1600 64 bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> ===== RESTART =====
>>>
Enter the height of the diamond: 7
The validated height of the diamond is: 7
*
* *
* * *
* * * *
>>> |
```

Stage 4:

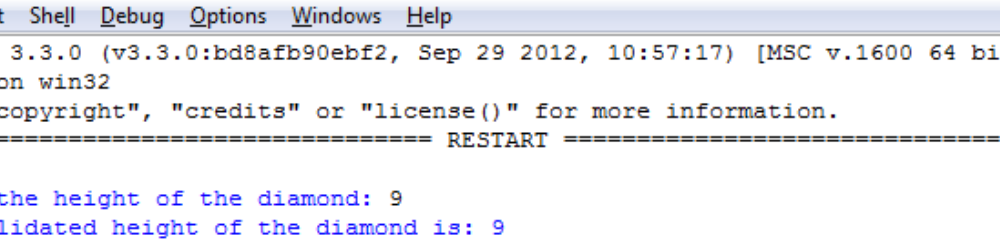
Now print the necessary spaces on each line to shift the point to the middle.



A screenshot of a Python Shell window titled "Python Shell". The window has a menu bar with "File", "Edit", "Shell", "Debug", "Options", "Windows", and "Help". The main text area shows the following content: "Python 3.3.0 (v3.3.0:bd8afb90ebf2, Sep 29 2012, 10:57:17) [MSC v.1600 64 bit (AMD64)] on win32", "Type 'copyright', 'credits' or 'license()' for more information.", and a prompt ">>> ===== RESTART =====". Below this, the user has entered "Enter the height of the diamond: 7" and the shell has responded "The validated height of the diamond is: 7". The user has then entered a prompt ">>>" and the shell has printed a diamond pattern of asterisks: a single asterisk on the first line, two on the second, three on the third, and four on the fourth. The status bar at the bottom right shows "Ln: 11 Col: 4".

```
Python 3.3.0 (v3.3.0:bd8afb90ebf2, Sep 29 2012, 10:57:17) [MSC v.1600 64 bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> ===== RESTART =====
>>>
Enter the height of the diamond: 7
The validated height of the diamond is: 7
*
* *
* * *
* * * *
>>>
```

Finally, add the bottom half of the diamond that is *almost* a mirror image of the top (one line less than the top).



The screenshot shows a Windows-style application window titled "Python Shell". The window has a menu bar with "File", "Edit", "Shell", "Debug", "Options", "Windows", and "Help". The main text area contains the following text:

```
Python 3.3.0 (v3.3.0:bd8afb90ebf2, Sep 29 2012, 10:57:17) [MSC v.1600 64 bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> ===== RESTART =====
>>>
Enter the height of the diamond: 9
The validated height of the diamond is: 9

  *
 * *
* * * *
* * * * *
 * * * *
  * * *
    * *
      *

>>> |
```

The status bar at the bottom right indicates "Ln: 16 Col: 4".

- Your program should use the following comment block at the very beginning of your program.

```

/*****
* Name:   Lisa Henderson           Date Assigned: Fill in   *
* Course: CSE 1284 Sec ?         Date Due:   Fill in       *
*                                              *
* File name:   Fill in                                           *
*                                              *
* Program Description:  Brief description of what the         *
* program does.                                                *
*****/

```

- Your program should made good use of whitespace.
- Include appropriate comments.
- Prompt the user for the height of the diamond (number of lines).

Deliverables:

For this homework assignment, all that should be submitted is your source code.

Grading:

Task	Points
Stage 1 only (validation)	65 points
Complete through Stage 2 (prints right triangle of asterisks)	75 points
Complete through Stage 3 (prints half of right triangle with spaces between)	80 points
Complete through Stage 4 (prints top half of diamond)	90 points
Complete through Stage 5 (full diamond)	100 points