INFDEV02-2
Homework 3

Dev Team

Abstraction, functions, recursion, and data structures.

Contents

Lecture Homework 3 - Lines

Draw line   Fill in the missing code blocks

```
1  def draw_line (           ):
2    res=""
3    while((n>          )):
4      res=(res+          )
5      n=(n-          )
6    return
7
8  res=draw_line(3)
9  print (          )
```

```
                 globals
                 stack
                 heap
                 definitions
                 globals
                 stack
                 heap
                 definitions    draw_line  (n) => ...
                 globals
                                     ret    null
                 stack
                                     n      3
                 heap
                 definitions    draw_line  (n) => ...
                 globals
                                     ret    null
                 stack               n      3
                                     res    ""
                 heap
                 definitions    draw_line  (n) => ...
                 globals
                                     ret    null
                 stack               n      3
                                     res    ""
                 heap
                 definitions    draw_line  (n) => ...
```

globals			
		ret	null
stack		n	3
		res	"*"
heap			
definitions	draw_line	(n) => ...	
globals			
		ret	null
stack		n	2
		res	"*"
heap			
definitions	draw_line	(n) => ...	
globals			
		ret	null
stack		n	2
		res	"*"
heap			
definitions	draw_line	(n) => ...	
globals			
		ret	null
stack		n	2
		res	"**"
heap			
definitions	draw_line	(n) => ...	
globals			
		ret	null
stack		n	1
		res	"**"
heap			
definitions	draw_line	(n) => ...	
globals			
		ret	null
stack		n	1
		res	"**"
heap			
definitions	draw_line	(n) => ...	

globals		
stack	ret	null
	n	1
	res	"***"
heap		
definitions	draw_line	(n) => ...

globals		
stack	ret	null
	n	0
	res	"***"
heap		
definitions	draw_line	(n) => ...

globals		
stack	ret	null
	n	0
	res	"***"
heap		
definitions	draw_line	(n) => ...

globals		
stack	ret	"***"
	n	0
	res	"***"
heap		
definitions	draw_line	(n) => ...

globals		
stack		
heap		
definitions	draw_line	(n) => ...

globals	res	"***"
stack		
heap		
definitions	draw_line	(n) => ...

globals	res	"***"
stack		
heap		
definitions	draw_line	(n) => ...
output		"***"

Repeat Fill in the missing code blocks

```
1 |def repeat (           ,           ):
2 |   res=
3 |   while((n>           )):
4 |              =(res+symbol)
5 |     n=(n-1)
6 |   return
7 |
8 |res=              ("#",3)
9 |print (           )
```

```
            globals
            stack
            heap
            definitions
            globals
            stack
            heap
            definitions    repeat  (symbol,n) => ...
            globals
                            ret       null
            stack           symbol    "#"
                            n         3
            heap
            definitions    repeat  (symbol,n) => ...
            globals
                            ret       null
                            symbol    "#"
            stack           n         3
                            res       ""
            heap
            definitions    repeat  (symbol,n) => ...
```

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globals		
stack	ret	null
	symbol	"#"
	n	3
	res	""
heap		
definitions	repeat	(symbol,n) => ...

globals		
stack	ret	null
	symbol	"#"
	n	3
	res	"#"
heap		
definitions	repeat	(symbol,n) => ...

globals		
stack	ret	null
	symbol	"#"
	n	2
	res	"#"
heap		
definitions	repeat	(symbol,n) => ...

globals		
stack	ret	null
	symbol	"#"
	n	2
	res	"#"
heap		
definitions	repeat	(symbol,n) => ...

globals		
stack	ret	null
	symbol	"#"
	n	2
	res	"##"
heap		
definitions	repeat	(symbol,n) => ...

globals		
	ret	null
	symbol	"#"
stack	n	1
	res	"##"
heap		
definitions	repeat	(symbol,n) => ...

globals		
	ret	null
	symbol	"#"
stack	n	1
	res	"##"
heap		
definitions	repeat	(symbol,n) => ...

globals		
	ret	null
	symbol	"#"
stack	n	1
	res	"###"
heap		
definitions	repeat	(symbol,n) => ...

globals		
	ret	null
	symbol	"#"
stack	n	0
	res	"###"
heap		
definitions	repeat	(symbol,n) => ...

globals		
	ret	null
	symbol	"#"
stack	n	0
	res	"###"
heap		
definitions	repeat	(symbol,n) => ...

globals		
	ret	"###"
stack	symbol	"#"
	n	0
	res	"###"
heap		
definitions	repeat	(symbol,n) => ...
globals		
stack		
heap		
definitions	repeat	(symbol,n) => ...
globals	res	"###"
stack		
heap		
definitions	repeat	(symbol,n) => ...
globals	res	"###"
stack		
heap		
definitions	repeat	(symbol,n) => ...
output		"###"

Lecture Homework 3 - Squares

Square   Fill in the missing code blocks

```
 1  def repeat (symbol ,n):
 2    res =""
 3    while((n>0)):
 4      res =(res+symbol)
 5      n=(n-1)
 6    return res
 7
 8  def draw_line (n):
 9    return repeat ("*",          )
10
11  def draw_square (n):
12    l=(draw_line(          ) +"\n")
13    return repeat (          ,          )
14
15  res =draw_square (3)
16
17  print (          )
```

	globals	
	stack	
	heap	
	definitions	
	globals	
	stack	
	heap	
	definitions	repeat (symbol,n) => ...
	globals	
	stack	
	heap	
	definitions	repeat (symbol,n) => ...
		draw_line (n) => ...
	globals	
	stack	
	heap	
		repeat (symbol,n) => ...
	definitions	draw_line (n) => ...
		draw_square (n) => ...

globals			
stack		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
		ret	null
		n	3
stack		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	3
stack		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	3
		res	""
stack		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	3
		res	""
stack		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
	ret	null	
	symbol	"*"	
	n	3	
	res	"*"	
stack	ret	null	
	n	3	
	ret	null	
	n	3	
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
	ret	null	
	symbol	"*"	
	n	2	
	res	"*"	
stack	ret	null	
	n	3	
	ret	null	
	n	3	
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
	ret	null	
	symbol	"*"	
	n	2	
	res	"*"	
stack	ret	null	
	n	3	
	ret	null	
	n	3	
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
	ret	null	
	symbol	"*"	
	n	2	
	res	"**"	
stack	ret	null	
	n	3	
	ret	null	
	n	3	
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	1
stack		res	"**"
		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	1
stack		res	"**"
		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	1
		res	"***"
stack		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	0
		res	"***"
stack		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	0
		res	"***"
stack		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
		ret	"***"
		symbol	"*"
		n	0
		res	"***"
stack		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
		ret	null
		n	3
stack		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals		
stack	ret	"***"
	n	3
	ret	null
	n	3
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_square	(n) => ...

globals		
stack	ret	null
	n	3
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_square	(n) => ...

globals		
stack	ret	null
	n	3
	l	"***\n"
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_square	(n) => ...

globals		
stack	ret	null
	symbol	"***\n"
	n	3
	ret	null
	n	3
	l	"***\n"
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_square	(n) => ...

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```
globals

                        ret        null
                        symbol    "***\n"
                        n            3
stack                   res         ""
                          ret      null
                          n        3
                          l      "***\n"
heap

              repeat        (symbol,n) => ...
definitions   draw_line        (n) => ...
              draw_square      (n) => ...
```

```
globals

                        ret        null
                        symbol    "***\n"
                        n            3
stack                   res         ""
                          ret      null
                          n        3
                          l      "***\n"
heap

              repeat        (symbol,n) => ...
definitions   draw_line        (n) => ...
              draw_square      (n) => ...
```

```
globals

                        ret        null
                        symbol    "***\n"
                        n            3
stack                   res       "***\n"
                          ret      null
                          n        3
                          l      "***\n"
heap

              repeat        (symbol,n) => ...
definitions   draw_line        (n) => ...
              draw_square      (n) => ...
```

globals		
	ret	null
	symbol	"***\n"
	n	2
stack	res	"***\n"
	ret	null
	n	3
	l	"***\n"
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_square	(n) => ...

globals		
	ret	null
	symbol	"***\n"
	n	2
stack	res	"***\n"
	ret	null
	n	3
	l	"***\n"
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_square	(n) => ...

globals		
	ret	null
	symbol	"***\n"
	n	2
stack	res	"***\n***\n"
	ret	null
	n	3
	l	"***\n"
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_square	(n) => ...

globals			
	ret	null	
	symbol	"***\n"	
	n	1	
stack	res	"***\n***\n"	
		ret	null
		n	3
		l	"***\n"
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
	ret	null	
	symbol	"***\n"	
	n	1	
stack	res	"***\n***\n"	
		ret	null
		n	3
		l	"***\n"
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
	ret	null	
	symbol	"***\n"	
	n	1	
stack	res	"***\n***\n***\n"	
		ret	null
		n	3
		l	"***\n"
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
	ret	null	
	symbol	"***\n"	
	n	0	
stack	res	"***\n***\n***\n"	
		ret	null
		n	3
		l	"***\n"
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
	ret	null	
	symbol	"***\n"	
	n	0	
stack	res	"***\n***\n***\n"	
		ret	null
		n	3
		l	"***\n"
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals			
	ret	"***\n***\n***\n"	
	symbol	"***\n"	
	n	0	
stack	res	"***\n***\n***\n"	
		ret	null
		n	3
		l	"***\n"
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_square	(n) => ...	

globals		
	ret	null
stack	n	3
	l	"***\n"
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_square	(n) => ...

globals		
	ret	"***\n***\n***\n"
stack	n	3
	l	"***\n"
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_square	(n) => ...

globals		
stack		
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_square	(n) => ...

globals	res	"***\n***\n***\n"
stack		
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_square	(n) => ...

globals	res	"***\n***\n***\n"
stack		
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_square	(n) => ...
output	"***\n***\n***\n"	

Empty square Fill in the missing code blocks

```
 1 def repeat (symbol,n):
 2   res=""
 3   while((n>0)):
 4     res=(res+symbol)
 5     n=(n-1)
 6   return res
 7
 8
 9 def draw_line (n):
10   return repeat("*",          )
11
12 def draw_empty_square (n):
13   l=(draw_line(          ) +"\n")
14   empty_line=(          +(repeat(" ",(n-2)) +"*\n"))
15   return (          +(repeat(empty_line,(n-          )) +
             ))
16
17
18 res=draw_empty_square(          )
19 print (          )
```

```
        globals
        stack
        heap
        definitions
        globals
        stack
        heap
        definitions    repeat  (symbol,n) => ...
        globals
        stack
        heap
        definitions    repeat      (symbol,n) => ...
                        draw_line     (n) => ...
```

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globals		
stack		
heap		
definitions	repeat	`(symbol,n) => ...`
	draw_line	`(n) => ...`
	draw_empty_square	`(n) => ...`

globals			
stack		ret	null
		n	3
heap			
definitions	repeat	`(symbol,n) => ...`	
	draw_line	`(n) => ...`	
	draw_empty_square	`(n) => ...`	

globals			
stack		ret	null
		n	3
		ret	null
		n	3
heap			
definitions	repeat	`(symbol,n) => ...`	
	draw_line	`(n) => ...`	
	draw_empty_square	`(n) => ...`	

globals			
stack		ret	null
		symbol	`"*"`
		n	3
		ret	null
		n	3
		ret	null
		n	3
heap			
definitions	repeat	`(symbol,n) => ...`	
	draw_line	`(n) => ...`	
	draw_empty_square	`(n) => ...`	

globals			
		ret	null
		symbol	"*"
		n	3
		res	""
stack		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_empty_square	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	3
		res	""
stack		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_empty_square	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	3
stack		res	"*"
		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_empty_square	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	2
stack		res	"*"
		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_empty_square	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	2
stack		res	"*"
		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat		(symbol,n) => ...
definitions	draw_line		(n) => ...
	draw_empty_square		(n) => ...

globals			
		ret	null
		symbol	"*"
		n	2
stack		res	"**"
		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat		(symbol,n) => ...
definitions	draw_line		(n) => ...
	draw_empty_square		(n) => ...

```
globals
                         ret       null
                         symbol    "*"
                         n         1
                         res       "**"
stack
                            ret   null
                            n     3
                            ret   null
                            n     3
heap
                repeat                (symbol,n) => ...
definitions     draw_line                  (n) => ...
                draw_empty_square          (n) => ...
```
```
globals
                         ret       null
                         symbol    "*"
                         n         1
                         res       "**"
stack
                            ret   null
                            n     3
                            ret   null
                            n     3
heap
                repeat                (symbol,n) => ...
definitions     draw_line                  (n) => ...
                draw_empty_square          (n) => ...
```

globals			
		ret	null
		symbol	"*"
		n	1
		res	"***"
stack		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_empty_square	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	0
		res	"***"
stack		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_empty_square	(n) => ...	

globals					
		ret	null		
		symbol	"*"		
		n	0		
stack		res	"***"		
			ret	null	
			n	3	
			ret	null	
			n	3	
heap					
	repeat		(symbol,n) => ...		
definitions	draw_line		(n) => ...		
	draw_empty_square		(n) => ...		

globals					
		ret	"***"		
		symbol	"*"		
		n	0		
stack		res	"***"		
			ret	null	
			n	3	
			ret	null	
			n	3	
heap					
	repeat		(symbol,n) => ...		
definitions	draw_line		(n) => ...		
	draw_empty_square		(n) => ...		

globals					
			ret	null	
			n	3	
stack			ret	null	
			n	3	
heap					
	repeat		(symbol,n) => ...		
definitions	draw_line		(n) => ...		
	draw_empty_square		(n) => ...		

globals		
stack	ret	"***"
	n	3
	ret	null
	n	3
heap		
definitions	repeat	(symbol,n) => ...
	draw_line	(n) => ...
	draw_empty_square	(n) => ...

globals		
stack	ret	null
	n	3
heap		
definitions	repeat	(symbol,n) => ...
	draw_line	(n) => ...
	draw_empty_square	(n) => ...

globals		
stack	ret	null
	n	3
	l	"***\n"
heap		
definitions	repeat	(symbol,n) => ...
	draw_line	(n) => ...
	draw_empty_square	(n) => ...

globals		
stack	ret	null
	symbol	" "
	n	1
	ret	null
	n	3
	l	"***\n"
heap		
definitions	repeat	(symbol,n) => ...
	draw_line	(n) => ...
	draw_empty_square	(n) => ...

globals			
		ret	null
		symbol	" "
		n	1
stack		res	""
		ret	null
		n	3
		l	"***\n"
heap			
	repeat		(symbol,n) => ...
definitions	draw_line		(n) => ...
	draw_empty_square		(n) => ...

globals			
		ret	null
		symbol	" "
		n	1
stack		res	""
		ret	null
		n	3
		l	"***\n"
heap			
	repeat		(symbol,n) => ...
definitions	draw_line		(n) => ...
	draw_empty_square		(n) => ...

globals			
		ret	null
		symbol	" "
		n	1
stack		res	" "
		ret	null
		n	3
		l	"***\n"
heap			
	repeat		(symbol,n) => ...
definitions	draw_line		(n) => ...
	draw_empty_square		(n) => ...

globals			
stack		ret	null
		symbol	" "
		n	0
		res	" "
		ret	null
		n	3
		l	"***\n"
heap			
definitions	repeat	(symbol,n) => ...	
	draw_line	(n) => ...	
	draw_empty_square	(n) => ...	

globals			
stack		ret	null
		symbol	" "
		n	0
		res	" "
		ret	null
		n	3
		l	"***\n"
heap			
definitions	repeat	(symbol,n) => ...	
	draw_line	(n) => ...	
	draw_empty_square	(n) => ...	

globals			
stack		ret	" "
		symbol	" "
		n	0
		res	" "
		ret	null
		n	3
		l	"***\n"
heap			
definitions	repeat	(symbol,n) => ...	
	draw_line	(n) => ...	
	draw_empty_square	(n) => ...	

globals		
stack	ret	null
	n	3
	l	"***\n"
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_empty_square	(n) => ...

globals		
	ret	null
stack	n	3
	l	"***\n"
	empty_line	"* *\n"
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_empty_square	(n) => ...

globals		
	ret	null
	symbol	"* *\n"
	n	1
stack	ret	null
	n	3
	l	"***\n"
	empty_line	"* *\n"
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_empty_square	(n) => ...

globals			
		ret	null
		symbol	"* *\n"
		n	1
		res	""
stack		ret	null
		n	3
		l	"***\n"
		empty_line	"* *\n"
heap			
	repeat		(symbol,n) => ...
definitions	draw_line		(n) => ...
	draw_empty_square		(n) => ...

globals			
		ret	null
		symbol	"* *\n"
		n	1
		res	""
stack		ret	null
		n	3
		l	"***\n"
		empty_line	"* *\n"
heap			
	repeat		(symbol,n) => ...
definitions	draw_line		(n) => ...
	draw_empty_square		(n) => ...

globals		
stack	ret	null
	symbol	"* *\n"
	n	1
	res	"* *\n"
	ret	null
	n	3
	l	"***\n"
	empty_line	"* *\n"
heap		
definitions	repeat	(symbol,n) => ...
	draw_line	(n) => ...
	draw_empty_square	(n) => ...

globals		
stack	ret	null
	symbol	"* *\n"
	n	0
	res	"* *\n"
	ret	null
	n	3
	l	"***\n"
	empty_line	"* *\n"
heap		
definitions	repeat	(symbol,n) => ...
	draw_line	(n) => ...
	draw_empty_square	(n) => ...

Block 1

globals		
stack	ret	null
	symbol	"* *\n"
	n	0
	res	"* *\n"
	ret	null
	n	3
	l	"***\n"
	empty_line	"* *\n"
heap		
definitions	repeat	(symbol,n) => ...
	draw_line	(n) => ...
	draw_empty_square	(n) => ...

Block 2

globals		
stack	ret	"* *\n"
	symbol	"* *\n"
	n	0
	res	"* *\n"
	ret	null
	n	3
	l	"***\n"
	empty_line	"* *\n"
heap		
definitions	repeat	(symbol,n) => ...
	draw_line	(n) => ...
	draw_empty_square	(n) => ...

Block 3

globals		
stack	ret	null
	n	3
	l	"***\n"
	empty_line	"* *\n"
heap		
definitions	repeat	(symbol,n) => ...
	draw_line	(n) => ...
	draw_empty_square	(n) => ...

globals		
	ret	`"***\n* *\n***\n"`
stack	n	3
	l	`"***\n"`
	empty_line	`"* *\n"`
heap		
	repeat	`(symbol,n) => ...`
definitions	draw_line	`(n) => ...`
	draw_empty_square	`(n) => ...`
globals		
stack		
heap		
	repeat	`(symbol,n) => ...`
definitions	draw_line	`(n) => ...`
	draw_empty_square	`(n) => ...`
globals	res	`"***\n* *\n***\n"`
stack		
heap		
	repeat	`(symbol,n) => ...`
definitions	draw_line	`(n) => ...`
	draw_empty_square	`(n) => ...`
globals	res	`"***\n* *\n***\n"`
stack		
heap		
	repeat	`(symbol,n) => ...`
definitions	draw_line	`(n) => ...`
	draw_empty_square	`(n) => ...`
output		`"***\n* *\n***\n"`

Lecture Homework 3 - Triangles

Draw triangle   Fill in the missing code blocks

```
1  def repeat (symbol,n):
2    res=""
3    while((n>0)):
4      res=(res+symbol)
5      n=(n-1)
6    return res
7
8  def draw_line (n):
9    return repeat("*",n)
10
11 def draw_triangle (n):
12   if((n<=0)):
13     return
14   else:
15     return (draw_line(        )+("\n"+draw_triangle((
                 -        )))))
16
17 res=draw_triangle(        )
18 print (res)
```

```
            globals
            stack
            heap
            definitions
            globals
            stack
            heap
            definitions   repeat  (symbol,n) => ...
            globals
            stack
            heap
                          repeat      (symbol,n) => ...
            definitions
                          draw_line     (n) => ...
            globals
            stack
            heap
                          repeat        (symbol,n) => ...
            definitions   draw_line       (n) => ...
                          draw_triangle    (n) => ...
```

```
 globals
                          ret    null
 stack
                          n      3
 heap
               repeat          (symbol,n) => ...
 definitions   draw_line           (n) => ...
               draw_triangle       (n) => ...
 globals
                          ret    null
 stack
                          n      3
 heap
               repeat          (symbol,n) => ...
 definitions   draw_line           (n) => ...
               draw_triangle       (n) => ...
 globals
                          ret    null
                          n      3
 stack
                          ret    null
                          n      3
 heap
               repeat          (symbol,n) => ...
 definitions   draw_line           (n) => ...
               draw_triangle       (n) => ...
 globals
                          ret      null
                          symbol   "*"
                          n        3
 stack
                          ret    null
                          n      3
                          ret    null
                          n      3
 heap
               repeat          (symbol,n) => ...
 definitions   draw_line           (n) => ...
               draw_triangle       (n) => ...
```

```
globals

                           ret      null
                           symbol   "*"
                           n        3
                           res      ""
stack
                             ret   null
                             n     3
                             ret   null
                             n     3
heap
              repeat          (symbol,n) => ...
definitions   draw_line           (n) => ...
              draw_triangle       (n) => ...

globals

                           ret      null
                           symbol   "*"
                           n        3
                           res      ""
stack
                             ret   null
                             n     3
                             ret   null
                             n     3
heap
              repeat          (symbol,n) => ...
definitions   draw_line           (n) => ...
              draw_triangle       (n) => ...
```

globals			
		ret	null
		symbol	"*"
		n	3
stack		res	"*"
		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	2
stack		res	"*"
		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	2
		res	"*"
stack		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	2
		res	"**"
stack		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	1
		res	"**"
stack		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	1
		res	"**"
stack		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	1
		res	"***"
stack		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	0
		res	"***"
stack		ret	null
		n	3
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

```
globals

                          ret        null
                          symbol     "*"
                          n          0
                          res        "***"
stack
                              ret    null
                              n      3
                              ret    null
                              n      3
heap
              repeat         (symbol,n) => ...
definitions   draw_line           (n) => ...
              draw_triangle       (n) => ...

globals

                          ret        "***"
                          symbol     "*"
                          n          0
                          res        "***"
stack
                              ret    null
                              n      3
                              ret    null
                              n      3
heap
              repeat         (symbol,n) => ...
definitions   draw_line           (n) => ...
              draw_triangle       (n) => ...

globals

                              ret    null
                              n      3
stack
                              ret    null
                              n      3
heap
              repeat         (symbol,n) => ...
definitions   draw_line           (n) => ...
              draw_triangle       (n) => ...
```

globals		
	ret	"***"
	n	3
stack		
	ret	null
	n	3
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_triangle	(n) => ...

globals		
	ret	null
stack		
	n	3
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_triangle	(n) => ...

globals		
	ret	null
	n	2
stack		
	ret	null
	n	3
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_triangle	(n) => ...

globals		
	ret	null
	n	2
stack		
	ret	null
	n	3
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_triangle	(n) => ...

globals			
stack		ret	null
		n	2
		ret	null
		n	2
		ret	null
		n	3
heap			
definitions	repeat	(symbol,n) => ...	
	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
stack		ret	null
		symbol	"*"
		n	2
		ret	null
		n	2
		ret	null
		n	2
		ret	null
		n	3
heap			
definitions	repeat	(symbol,n) => ...	
	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

```
globals
                      ret       null
                      symbol    "*"
                      n         2
                      res       ""
                         ret   null
stack
                         n     2
                         ret   null
                         n     2
                         ret   null
                         n     3
heap
              repeat           (symbol,n) => ...
definitions   draw_line           (n) => ...
              draw_triangle       (n) => ...
globals
                      ret       null
                      symbol    "*"
                      n         2
                      res       ""
                         ret   null
stack
                         n     2
                         ret   null
                         n     2
                         ret   null
                         n     3
heap
              repeat           (symbol,n) => ...
definitions   draw_line           (n) => ...
              draw_triangle       (n) => ...
```

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```
globals
                        ret        null
                        symbol     "*"
                        n          2
                        res        "*"
                           ret    null
stack
                           n      2
                           ret    null
                           n      2
                           ret    null
                           n      3
heap
              repeat            (symbol,n) => ...
definitions   draw_line            (n) => ...
              draw_triangle        (n) => ...
```

```
globals
                        ret        null
                        symbol     "*"
                        n          1
                        res        "*"
                           ret    null
stack
                           n      2
                           ret    null
                           n      2
                           ret    null
                           n      3
heap
              repeat            (symbol,n) => ...
definitions   draw_line            (n) => ...
              draw_triangle        (n) => ...
```

globals			
		ret	null
		symbol	"*"
		n	1
		res	"*"
stack		ret	null
		n	2
		ret	null
		n	2
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	1
		res	"**"
stack		ret	null
		n	2
		ret	null
		n	2
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
	ret	null	
	symbol	"*"	
	n	0	
	res	"**"	
stack	ret	null	
	n	2	
	ret	null	
	n	2	
	ret	null	
	n	3	
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
	ret	null	
	symbol	"*"	
	n	0	
	res	"**"	
stack	ret	null	
	n	2	
	ret	null	
	n	2	
	ret	null	
	n	3	
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
	ret	"**"	
	symbol	"*"	
	n	0	
	res	"**"	
stack		ret	null
		n	2
		ret	null
		n	2
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
stack		ret	null
		n	2
		ret	null
		n	2
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
		ret	"**"
		n	2
stack		ret	null
		n	2
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
		ret	null
		n	2
stack		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
		ret	null
		n	1
stack		ret	null
		n	2
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
	ret	null	
	n	1	
stack	ret	null	
	n	2	
	ret	null	
	n	3	
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
	ret	null	
	n	1	
	ret	null	
	n	1	
stack	ret	null	
	n	2	
	ret	null	
	n	3	
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals		
	ret	null
	symbol	"*"
	n	1
stack	ret	null
	n	1
	ret	null
	n	1
	ret	null
	n	2
	ret	null
	n	3
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_triangle	(n) => ...

globals		
	ret	null
	symbol	"*"
	n	1
	res	""
stack	ret	null
	n	1
	ret	null
	n	1
	ret	null
	n	2
	ret	null
	n	3
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_triangle	(n) => ...

```
globals
                            ret      null
                            symbol   "*"
                            n        1
                            res      ""
                              ret   null
                              n     1
stack
                              ret   null
                              n     1
                              ret   null
                              n     2
                              ret   null
                              n     3
heap
               repeat           (symbol,n) => ...
definitions    draw_line           (n) => ...
               draw_triangle       (n) => ...
globals
                            ret      null
                            symbol   "*"
                            n        1
                            res      "*"
                              ret   null
                              n     1
stack
                              ret   null
                              n     1
                              ret   null
                              n     2
                              ret   null
                              n     3
heap
               repeat           (symbol,n) => ...
definitions    draw_line           (n) => ...
               draw_triangle       (n) => ...
```

globals			
		ret	null
		symbol	"*"
		n	0
		res	"*"
stack		ret	null
		n	1
		ret	null
		n	1
		ret	null
		n	2
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	0
		res	"*"
stack		ret	null
		n	1
		ret	null
		n	1
		ret	null
		n	2
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
		ret	"*"
		symbol	"*"
		n	0
		res	"*"
stack		ret	null
		n	1
		ret	null
		n	1
		ret	null
		n	2
		ret	null
		n	3
heap			
definitions	repeat	(symbol,n) => ...	
	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
		ret	null
		n	1
stack		ret	null
		n	1
		ret	null
		n	2
		ret	null
		n	3
heap			
definitions	repeat	(symbol,n) => ...	
	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals		
	ret	"*"
	n	1
	ret	null
	n	1
stack	ret	null
	n	2
	ret	null
	n	3
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_triangle	(n) => ...

globals		
	ret	null
	n	1
	ret	null
stack	n	2
	ret	null
	n	3
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_triangle	(n) => ...

globals			
		ret	null
		n	0
		ret	null
		n	1
stack		ret	null
		n	2
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
		ret	null
		n	0
		ret	null
		n	1
stack		ret	null
		n	2
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

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globals			
		ret	""
		n	0
		ret	null
		n	1
stack		ret	null
		n	2
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
		ret	null
		n	1
		ret	null
stack		n	2
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals			
		ret	"*\n"
		n	1
		ret	null
stack		n	2
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	

globals		
	ret	null
	n	2
stack	ret	null
	n	3
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_triangle	(n) => ...

globals		
	ret	"**\n*\n"
	n	2
stack	ret	null
	n	3
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_triangle	(n) => ...

globals		
	ret	null
stack	n	3
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_triangle	(n) => ...

globals		
	ret	"***\n**\n*\n"
stack	n	3
heap		
	repeat	(symbol,n) => ...
definitions	draw_line	(n) => ...
	draw_triangle	(n) => ...

globals			
stack			
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	
globals		res	"***\n**\n*\n"
stack			
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	
globals		res	"***\n**\n*\n"
stack			
heap			
	repeat	(symbol,n) => ...	
definitions	draw_line	(n) => ...	
	draw_triangle	(n) => ...	
output		"***\n**\n*\n"	

Draw pyramid Fill in the missing state blocks

```
1   def repeat (symbol,n):
2     res=""
3     while((n>0)):
4       res=(res+symbol)
5       n=(n-1)
6     return res
7
8   def draw_pyramid_AUX (num_spaces,num_stars):
9     if((num_spaces<0)):
10      return ""
11    else:
12      spaces=repeat(" ",num_spaces)
13      stars=repeat("*",num_stars)
14      return (spaces+(stars+("\n"+draw_pyramid_AUX((num_spaces
          -1),(num_stars+2)))))
15
16  def draw_pyramid (n):
17    return draw_pyramid_AUX((n-1),1)
18
19  res=draw_pyramid(3)
20  print (res)
```

globals	
stack	
heap	
definitions	

globals	
stack	
heap	
definitions	repeat (symbol,n) => ...

globals		
stack		
heap		
definitions	repeat	(symbol,n) => ...
	draw_pyramid_AUX	(num_spaces,num_stars) => ...

globals		
stack		
heap		
	repeat	(symbol,n) => ...
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...
	draw_pyramid	(n) => ...

globals		
stack	ret	null
	n	
heap		
definitions	repeat	(symbol,n) => ...
	draw_pyramid_AUX	(num_spaces,num_stars) => ...
	draw_pyramid	(n) => ...

globals		
stack	ret	null
	num_spaces	2
	num_stars	1
	ret	null
	n	3
heap		
definitions	repeat	(symbol,n) => ...
	draw_pyramid_AUX	(num_spaces,num_stars) => ...
	draw_pyramid	(n) => ...

globals		
stack	ret	null
	num_spaces	2
	num_stars	1
	ret	null
	n	3
heap		
definitions	repeat	(symbol,n) => ...
	draw_pyramid_AUX	(num_spaces,num_stars) => ...
	draw_pyramid	(n) => ...

globals			
		ret	null
		symbol	" "
		n	2
stack		ret	null
		num_spaces	2
		num_stars	1
		ret	null
		n	
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		symbol	" "
		n	2
		res	""
stack		ret	null
		num_spaces	2
		num_stars	1
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		symbol	" "
		n	2
		res	""
stack		ret	null
		num_spaces	2
		num_stars	1
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		symbol	" "
		n	2
		res	" "
stack		ret	null
		num_spaces	2
		num_stars	1
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		symbol	" "
		n	1
		res	" "
stack		ret	null
		num_spaces	2
		num_stars	1
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		symbol	" "
		n	1
		res	" "
stack		ret	null
		num_spaces	2
		num_stars	1
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		symbol	" "
		n	1
		res	" "
stack		ret	null
		num_spaces	2
		num_stars	1
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		symbol	" "
		n	0
		res	" "
stack		ret	null
		num_spaces	2
		num_stars	1
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

```
globals
                              ret       null
                              symbol    " "
                              n         0
                              res       " "
stack                     ret           null
                          num_spaces    2
                          num_stars     1
                               ret   null
                               n     3
heap
             repeat                   (symbol,n) => ...
definitions  draw_pyramid_AUX  (num_spaces,num_stars) => ...
             draw_pyramid                    (n) => ...
globals
                              ret       "   "
                              symbol    " "
                              n         0
                              res       " "
stack                     ret           null
                          num_spaces    2
                          num_stars     1
                          ret
                          n         3
heap
             repeat                   (symbol,n) => ...
definitions  draw_pyramid_AUX  (num_spaces,num_stars) => ...
             draw_pyramid                    (n) => ...
```

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globals			
		ret	null
		num_spaces	2
stack		num_stars	1
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		num_spaces	2
		num_stars	1
stack		spaces	" "
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	1
		ret	null
		num_spaces	2
stack		num_stars	1
		spaces	" "
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

```
globals
                              ret       null
                              symbol    "*"
                              n         1
                              res       ""
stack                         ret          null
                              num_spaces   2
                              num_stars    1
                              spaces       "  "
                                     ret   null
                                     n     3

heap
              repeat                   (symbol,n) => ...
definitions   draw_pyramid_AUX  (num_spaces,num_stars) => ...
              draw_pyramid                (n) => ...
```

```
globals
                              ret       null
                              symbol    "*"
                              n         1
                              res       ""
stack                         ret          null
                              num_spaces   2
                              num_stars    1
                              spaces       "  "
                                     ret   null
                                     n     3

heap
              repeat                   (symbol,n) => ...
definitions   draw_pyramid_AUX  (num_spaces,num_stars) => ...
              draw_pyramid                (n) => ...
```

```
globals

stack
                                    ret       null
                                    symbol    "*"
                                    n         1
                                    res       "*"
                                    ret          null
                                    num_spaces   2
                                    num_stars    1
                                    spaces       "  "
                                        ret   null
                                        n     3

heap

definitions   repeat              (symbol,n) => ...
              draw_pyramid_AUX   (num_spaces,num_stars) => ...
              draw_pyramid             (n) => ...
```

```
globals

stack
                                    ret       null
                                    symbol    "*"
                                    n         0
                                    res       "*"
                                    ret          null
                                    num_spaces   2
                                    num_stars    1
                                    spaces       "  "
                                        ret   null
                                        n     3

heap

definitions   repeat              (symbol,n) => ...
              draw_pyramid_AUX   (num_spaces,num_stars) => ...
              draw_pyramid             (n) => ...
```

```
globals
                                  ret        null
                                  symbol     "*"
                                  n          0
                                  res        "*"
                                  ret           null
stack                             num_spaces    2
                                  num_stars     1
                                  spaces         "   "
                                      ret   null
                                      n     3

heap
              repeat                    (symbol,n) => ...
definitions   draw_pyramid_AUX   (num_spaces,num_stars) => ...
              draw_pyramid                  (n) => ...
globals
                                  ret        "*"
                                  symbol     "*"
                                  n          0
                                  res        "*"
                                  ret           null
stack                             num_spaces    2
                                  num_stars     1
                                  spaces         "   "
                                  ret
                                  n     3

heap
              repeat                    (symbol,n) => ...
definitions   draw_pyramid_AUX   (num_spaces,num_stars) => ...
              draw_pyramid                  (n) => ...
```

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globals			
		ret	null
		num_spaces	2
		num_stars	1
stack		spaces	" "
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		num_spaces	2
		num_stars	1
stack		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

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globals			
		ret	null
		num_spaces	1
		num_stars	3
		ret	null
		num_spaces	2
stack		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		num_spaces	1
		num_stars	3
		ret	null
		num_spaces	2
stack		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

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```
globals

                                     ret       null
                                     symbol    " "
                                     n         1
                                     ret          null
                                     num_spaces   1
                                     num_stars    3
stack                                ret          null
                                     num_spaces   2
                                     num_stars    1
                                     spaces       "  "
                                     stars        "*"
                                         ret   null
                                         n     3
heap

              repeat                      (symbol,n) => ...
definitions   draw_pyramid_AUX  (num_spaces,num_stars) => ...
              draw_pyramid                    (n) => ...
```

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globals			
		ret	null
		symbol	" "
		n	1
		res	""
		ret	null
		num_spaces	1
		num_stars	3
stack		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
	ret	null	
	symbol	" "	
	n	1	
	res	""	
	ret	null	
	num_spaces	1	
	num_stars	3	
	ret	null	
stack	num_spaces	2	
	num_stars	1	
	spaces	" "	
	stars	"*"	
	ret	null	
	n	3	

heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals				
		ret	null	
		symbol	" "	
		n	1	
		res	" "	
		ret	null	
		num_spaces	1	
		num_stars	3	
stack		ret	null	
		num_spaces	2	
		num_stars	1	
		spaces	" "	
		stars	"*"	
		ret	null	
		n	3	
heap				
	repeat	(symbol,n) => ...		
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...		
	draw_pyramid	(n) => ...		

```
globals

                              ret       null
                              symbol    " "
                              n         0
                              res       " "
                              ret       null
                              num_spaces   1
                              num_stars    3
stack
                              ret       null
                              num_spaces   2
                              num_stars    1
                              spaces    "  "
                              stars     "*"
                                ret    null
                                n      3
heap

             repeat              (symbol,n) => ...
definitions  draw_pyramid_AUX  (num_spaces,num_stars) => ...
             draw_pyramid            (n) => ...
```

```
globals

                              ret       null
                              symbol    " "
                              n         0
                              res       " "
                              ret          null
                              num_spaces   1
                              num_stars    3
stack                         ret          null
                              num_spaces   2
                              num_stars    1
                              spaces       "  "
                              stars        "*"
                                 ret    null
                                 n      3

heap
               repeat                 (symbol,n) => ...
definitions    draw_pyramid_AUX  (num_spaces,num_stars) => ...
               draw_pyramid              (n) => ...
```

globals			
		ret	" "
		symbol	" "
		n	0
		res	" "
		ret	null
		num_spaces	1
		num_stars	3
stack		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		num_spaces	1
		num_stars	3
		ret	null
		num_spaces	2
stack		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals		

stack	ret	null
	num_spaces	1
	num_stars	3
	spaces	" "
	ret	null
	num_spaces	2
	num_stars	1
	spaces	" "
	stars	"*"
	ret	null
	n	3

heap		

definitions	repeat	(symbol,n) => ...
	draw_pyramid_AUX	(num_spaces,num_stars) => ...
	draw_pyramid	(n) => ...

globals		

stack	ret	null
	symbol	"*"
	n	3
	ret	null
	num_spaces	1
	num_stars	3
	spaces	" "
	ret	null
	num_spaces	2
	num_stars	1
	spaces	" "
	stars	"*"
	ret	
	n	

heap		

definitions	repeat	(symbol,n) => ...
	draw_pyramid_AUX	(num_spaces,num_stars) => ...
	draw_pyramid	(n) => ...

globals			
		ret	null
		symbol	"*"
		n	3
		res	""
		ret	null
		num_spaces	1
		num_stars	3
stack		spaces	" "
		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	3
		res	""
stack		ret	null
		num_spaces	1
		num_stars	3
		spaces	" "
		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
definitions	repeat	(symbol,n) => ...	
	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	3
		res	"*"
		ret	null
		num_spaces	1
		num_stars	3
		spaces	" "
stack		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	2
		res	"*"
		ret	null
		num_spaces	1
		num_stars	3
stack		spaces	" "
		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	2
		res	"*"
		ret	null
		num_spaces	1
		num_stars	3
stack		spaces	" "
		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		symbol	"*"
		n	2
		res	"**"
		ret	null
		num_spaces	1
		num_stars	3
stack		spaces	" "
		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

```
globals

                              ret      null
                              symbol   "*"
                              n        1
                              res      "**"
                             ─────────────────
                              ret         null
                              num_spaces  1
                              num_stars   3
stack                         spaces      " "
                             ─────────────────
                              ret         null
                              num_spaces  2
                              num_stars   1
                              spaces      "  "
                              stars       "*"
                             ─────────────────
                                ret   null
                                n     3

heap

              repeat              (symbol,n) => ...
definitions   draw_pyramid_AUX    (num_spaces,num_stars) => ...
              draw_pyramid               (n) => ...
```

```
globals

                              ret       null
                              symbol    "*"
                              n         1
                              res       "**"
                              ret           null
                              num_spaces    1
                              num_stars     3
stack                         spaces        " "
                              ret           null
                              num_spaces    2
                              num_stars     1
                              spaces        "  "
                              stars         "*"
                                 ret    null
                                 n      3
heap

                repeat                  (symbol,n) => ...
definitions     draw_pyramid_AUX  (num_spaces,num_stars) => ...
                draw_pyramid                 (n) => ...
```

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```
globals

                              ret        null
                              symbol     "*"
                              n          1
                              res        "***"
                              ret        null
                              num_spaces 1
                              num_stars  3
stack                         spaces     " "
                              ret        null
                              num_spaces 2
                              num_stars  1
                              spaces     "  "
                              stars      "*"
                                ret   null
                                n     3

heap

              repeat                    (symbol,n) => ...
definitions   draw_pyramid_AUX  (num_spaces,num_stars) => ...
              draw_pyramid                   (n) => ...
```

globals			
		ret	null
		symbol	"*"
		n	0
		res	"***"
		ret	null
		num_spaces	1
		num_stars	3
stack		spaces	" "
		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

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```
globals

                              ret        null
                              symbol     "*"
                              n          0
                              res        "***"
                              ret        null
                              num_spaces   1
                              num_stars    3
stack                         spaces       " "
                              ret        null
                              num_spaces   2
                              num_stars    1
                              spaces       "  "
                              stars        "*"
                                  ret    null
                                  n      3
heap

               repeat                   (symbol,n) => ...
definitions    draw_pyramid_AUX  (num_spaces,num_stars) => ...
               draw_pyramid                  (n) => ...
```

```
globals
                         ret      "***"
                         symbol   "*"
                         n        0
                         res      "***"
                         ret         null
                         num_spaces  1
                         num_stars   3
stack                    spaces      " "
                         ret         null
                         num_spaces  2
                         num_stars   1
                         spaces      "  "
                         stars       "*"
                         ret
                         n        3
heap
            repeat                 (symbol,n) => ...
definitions draw_pyramid_AUX  (num_spaces,num_stars) => ...
            draw_pyramid           (n) => ...
```

```
globals
                         ret         null
                         num_spaces  1
                         num_stars   3
                         spaces      " "
                         ret         null
stack                    num_spaces  2
                         num_stars   1
                         spaces      "  "
                         stars       "*"
                         ret   null
                         n     3
heap
            repeat                 (symbol,n) => ...
definitions draw_pyramid_AUX  (num_spaces,num_stars) => ...
            draw_pyramid           (n) => ...
```

globals			
		ret	null
		num_spaces	1
		num_stars	3
		spaces	" "
		stars	"***"
stack		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		num_spaces	0
		num_stars	5
		ret	null
		num_spaces	1
		num_stars	3
		spaces	" "
stack		stars	"***"
		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		num_spaces	0
		num_stars	5
		ret	null
		num_spaces	1
		num_stars	3
		spaces	" "
stack		stars	"***"
		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat		(symbol,n) => ...
definitions	draw_pyramid_AUX		(num_spaces,num_stars) => ...
	draw_pyramid		(n) => ...

globals			
		ret	null
		symbol	" "
		n	0
		ret	null
		num_spaces	0
		num_stars	5
		ret	null
		num_spaces	1
stack		num_stars	3
		spaces	" "
		stars	"***"
		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

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```
globals

                                  ret       null
                                  symbol    " "
                                  n          0
                                  res       ""
                                  ret       null
                                  num_spaces  0
                                  num_stars   5
                                  ret       null
                                  num_spaces  1
                                  num_stars   3
stack                             spaces      " "
                                  stars       "***"
                                  ret       null
                                  num_spaces  2
                                  num_stars   1
                                  spaces      "  "
                                  stars       "*"
                                     ret   null
                                     n     3
heap

              repeat                  (symbol,n) => ...
definitions   draw_pyramid_AUX  (num_spaces,num_stars) => ...
              draw_pyramid                (n) => ...
```

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globals

stack

ret	null
symbol	" "
n	0
res	""

ret	null
num_spaces	0
num_stars	5

ret	null
num_spaces	1
num_stars	3
spaces	" "
stars	"***"

ret	null
num_spaces	2
num_stars	1
spaces	" "
stars	"*"

ret	null
n	3

heap

definitions	repeat	(symbol,n) => ...
	draw_pyramid_AUX	(num_spaces,num_stars) => ...
	draw_pyramid	(n) => ...

```
globals

                                    ret        ""
                                    symbol     " "
                                    n          0
                                    res        ""
                          ret            null
                          num_spaces     0
                          num_stars      5
                          ret            null
                          num_spaces     1
stack                     num_stars      3
                          spaces         " "
                          stars          "***"
                          ret            null
                          num_spaces     2
                          num_stars      1
                          spaces         "  "
                          stars          "*"
                            ret
                            n        3
heap

               repeat                   (symbol,n) => ...
definitions    draw_pyramid_AUX  (num_spaces,num_stars) => ...
               draw_pyramid                 (n) => ...
```

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globals			
		ret	null
		num_spaces	0
		num_stars	5
		ret	null
		num_spaces	1
		num_stars	3
		spaces	" "
stack		stars	"***"
		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

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```
globals
                         ret           null
                         num_spaces    0
                         num_stars     5
                         spaces        ""
                         ret           null
                         num_spaces    1
                         num_stars     3
                         spaces        " "
         stack           stars         "***"
                         ret           null
                         num_spaces    2
                         num_stars     1
                         spaces        "  "
                         stars         "*"
                              ret   null
                              n     3
         heap
                 repeat                  (symbol,n) => ...
         definitions     draw_pyramid_AUX  (num_spaces,num_stars) => ...
                 draw_pyramid                (n) => ...
```

```
globals

                                      ret        null
                                      symbol     "*"
                                      n          5
                             ret          null
                             num_spaces   0
                             num_stars    5
                             spaces       ""
                             ret          null
                             num_spaces   1
stack                        num_stars    3
                             spaces       " "
                             stars        "***"
                             ret          null
                             num_spaces   2
                             num_stars    1
                             spaces       "  "
                             stars        "*"
                                      ret       null
                                      n

heap

               repeat                    (symbol,n) => ...
definitions    draw_pyramid_AUX    (num_spaces,num_stars) => ...
               draw_pyramid                  (n) => ...
```

globals			
		ret	null
		symbol	"*"
		n	5
		res	""
		ret	null
		num_spaces	0
		num_stars	5
		spaces	""
		ret	null
		num_spaces	1
stack		num_stars	3
		spaces	" "
		stars	"***"
		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

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```
globals

                              ret       null
                              symbol    "*"
                              n         5
                              res       ""
                              ret       null
                              num_spaces  0
                              num_stars   5
                              spaces      ""
                              ret       null
                              num_spaces  1
stack                         num_stars   3
                              spaces      " "
                              stars       "***"
                              ret       null
                              num_spaces  2
                              num_stars   1
                              spaces      "  "
                              stars       "*"
                                  ret    null
                                  n      3

heap
             repeat                   (symbol,n) => ...
definitions  draw_pyramid_AUX  (num_spaces,num_stars) => ...
             draw_pyramid                   (n) => ...
```

globals			
		ret	null
		symbol	"*"
		n	5
		res	"*"
		ret	null
		num_spaces	0
		num_stars	5
		spaces	""
		ret	null
		num_spaces	1
stack		num_stars	3
		spaces	" "
		stars	"***"
		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals		

stack

ret	null
symbol	"*"
n	4
res	"*"

ret	null
num_spaces	0
num_stars	5
spaces	""

ret	null
num_spaces	1
num_stars	3
spaces	" "
stars	"***"

ret	null
num_spaces	2
num_stars	1
spaces	" "
stars	"*"

ret	null
n	3

heap

definitions		
	repeat	(symbol,n) => ...
	draw_pyramid_AUX	(num_spaces,num_stars) => ...
	draw_pyramid	(n) => ...

```
globals
                              ret       null
                              symbol    "*"
                              n         4
                              res       "*"
                          ret       null
                          num_spaces   0
                          num_stars    5
                          spaces       ""
                          ret       null
                          num_spaces   1
                          num_stars    3
stack                     spaces       " "
                          stars        "***"
                          ret       null
                          num_spaces   2
                          num_stars    1
                          spaces       "  "
                          stars        "*"
                              ret    null
                              n      3
heap
            repeat                  (symbol,n) => ...
definitions draw_pyramid_AUX  (num_spaces,num_stars) => ...
            draw_pyramid               (n) => ...
```

globals			
		ret	null
		symbol	"*"
		n	4
		res	"**"
	ret	null	
	num_spaces	0	
	num_stars	5	
	spaces	""	
	ret	null	
	num_spaces	1	
stack	num_stars	3	
	spaces	" "	
	stars	"***"	
	ret	null	
	num_spaces	2	
	num_stars	1	
	spaces	" "	
	stars	"*"	
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			

stack			
	ret	null	
	symbol	"*"	
	n	3	
	res	"**"	
	ret	null	
	num_spaces	0	
	num_stars	5	
	spaces	""	
	ret	null	
	num_spaces	1	
	num_stars	3	
	spaces	" "	
	stars	"***"	
	ret	null	
	num_spaces	2	
	num_stars	1	
	spaces	" "	
	stars	"*"	
	ret	null	
	n	3	

heap			

definitions	repeat	(symbol,n) => ...
	draw_pyramid_AUX	(num_spaces,num_stars) => ...
	draw_pyramid	(n) => ...

globals			
		ret	null
		symbol	"*"
		n	3
		res	"**"
	ret		null
	num_spaces		0
	num_stars		5
	spaces		""
	ret		null
	num_spaces		1
stack	num_stars		3
	spaces		" "
	stars		"***"
	ret		null
	num_spaces		2
	num_stars		1
	spaces		" "
	stars		"*"
		ret	null
		n	3
heap			
	repeat		(symbol,n) => ...
definitions	draw_pyramid_AUX		(num_spaces,num_stars) => ...
	draw_pyramid		(n) => ...

```
globals

                              ret      null
                              symbol   "*"
                              n        3
                              res      "***"
                              ret        null
                              num_spaces  0
                              num_stars   5
                              spaces      ""
                              ret        null
stack                         num_spaces  1
                              num_stars   3
                              spaces      " "
                              stars       "***"
                              ret        null
                              num_spaces  2
                              num_stars   1
                              spaces      "  "
                              stars       "*"
                                  ret    null
                                  n      3
heap

              repeat                 (symbol,n) => ...
definitions   draw_pyramid_AUX  (num_spaces,num_stars) => ...
              draw_pyramid               (n) => ...
```

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```
globals
                                ret        null
                                symbol     "*"
                                n          2
                                res        "***"
                                ret        null
                                num_spaces   0
                                num_stars    5
                                spaces       ""
                                ret        null
                                num_spaces   1
                                num_stars    3
  stack                         spaces       " "
                                stars        "***"
                                ret        null
                                num_spaces   2
                                num_stars    1
                                spaces       "  "
                                stars        "*"
                                    ret    null
                                    n      3
  heap
                  repeat                   (symbol,n) => ...
  definitions     draw_pyramid_AUX   (num_spaces,num_stars) => ...
                  draw_pyramid               (n) => ...
```

globals			
		ret	null
		symbol	"*"
		n	2
		res	"***"
		ret	null
		num_spaces	0
		num_stars	5
		spaces	""
		ret	null
		num_spaces	1
		num_stars	3
		spaces	" "
		stars	"***"
stack		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

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```
globals

                                        ret        null
                                        symbol     "*"
                                        n          2
                                        res        "****"
                                        ret        null
                                        num_spaces 0
                                        num_stars  5
                                        spaces     ""
                                        ret        null
                                        num_spaces 1
stack                                   num_stars  3
                                        spaces     " "
                                        stars      "***"
                                        ret        null
                                        num_spaces 2
                                        num_stars  1
                                        spaces     "  "
                                        stars      "*"
                                            ret    null
                                            n      3

heap
             repeat                   (symbol,n) => ...
definitions  draw_pyramid_AUX  (num_spaces,num_stars) => ...
             draw_pyramid               (n) => ...
```

globals		

	ret	null
	symbol	"*"
	n	1
	res	"****"

	ret	null
	num_spaces	0
	num_stars	5
	spaces	""

	ret	null
stack	num_spaces	1
	num_stars	3
	spaces	" "
	stars	"***"

	ret	null
	num_spaces	2
	num_stars	1
	spaces	" "
	stars	"*"

	ret	null
	n	3

heap		

	repeat	(symbol,n) => ...
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...
	draw_pyramid	(n) => ...

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```
globals

                              ret        null
                              symbol     "*"
                              n          1
                              res        "****"
                              ret        null
                              num_spaces  0
                              num_stars   5
                              spaces     ""
                              ret        null
                              num_spaces  1
stack                         num_stars   3
                              spaces     " "
                              stars      "***"
                              ret        null
                              num_spaces  2
                              num_stars   1
                              spaces     "  "
                              stars      "*"
                                  ret    null
                                  n      3

heap

              repeat                   (symbol,n) => ...
definitions   draw_pyramid_AUX  (num_spaces,num_stars) => ...
              draw_pyramid              (n) => ...
```

globals			
		ret	null
		symbol	"*"
		n	1
		res	"*****"
		ret	null
		num_spaces	0
		num_stars	5
		spaces	""
		ret	null
		num_spaces	1
stack		num_stars	3
		spaces	" "
		stars	"***"
		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

```
globals
                                    ret        null
                                    symbol     "*"
                                    n          0
                                    res        "*****"
                                    ret        null
                                    num_spaces  0
                                    num_stars   5
                                    spaces      ""
                                    ret        null
                                    num_spaces  1
          stack                     num_stars   3
                                    spaces      " "
                                    stars       "***"
                                    ret        null
                                    num_spaces  2
                                    num_stars   1
                                    spaces      "  "
                                    stars       "*"
                                        ret    null
                                        n      3
heap
             repeat                       (symbol,n) => ...
definitions  draw_pyramid_AUX  (num_spaces,num_stars) => ...
             draw_pyramid                    (n) => ...
```

```
globals

                              ret          null
                              symbol       "*"
                              n            0
                              res          "*****"
                              ret          null
                              num_spaces   0
                              num_stars    5
                              spaces       ""
                              ret          null
                              num_spaces   1
stack                         num_stars    3
                              spaces       " "
                              stars        "***"
                              ret          null
                              num_spaces   2
                              num_stars    1
                              spaces       "  "
                              stars        "*"
                                    ret   null
                                    n     3

heap
              repeat                   (symbol,n) => ...
definitions   draw_pyramid_AUX   (num_spaces,num_stars) => ...
              draw_pyramid                 (n) => ...
```

globals			
		ret	`"*****"`
		symbol	`"*"`
		n	0
		res	`"*****"`
		ret	null
		num_spaces	0
		num_stars	5
		spaces	`""`
		ret	null
		num_spaces	1
stack		num_stars	3
		spaces	`" "`
		stars	`"***"`
		ret	null
		num_spaces	2
		num_stars	1
		spaces	`"  "`
		stars	`"*"`
		ret	
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		num_spaces	0
		num_stars	5
		spaces	""
		ret	null
		num_spaces	1
		num_stars	3
		spaces	" "
stack		stars	"***"
		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		num_spaces	0
		num_stars	5
		spaces	""
		stars	"*****"
		ret	null
		num_spaces	1
		num_stars	3
stack		spaces	" "
		stars	"***"
		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

globals			
		ret	null
		num_spaces	-1
		num_stars	7
		ret	null
		num_spaces	0
		num_stars	5
		spaces	""
		stars	"*****"
stack		ret	null
		num_spaces	1
		num_stars	3
		spaces	" "
		stars	"***"
		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

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globals		
	ret	null
	num_spaces	-1
	num_stars	7
	ret	null
	num_spaces	0
	num_stars	5
	spaces	""
	stars	"*****"
stack	ret	null
	num_spaces	1
	num_stars	3
	spaces	" "
	stars	"***"
	ret	null
	num_spaces	2
	num_stars	1
	spaces	" "
	stars	"*"
	ret	null
	n	3
heap		
	repeat	(symbol,n) => ...
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...
	draw_pyramid	(n) => ...

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```
globals

                              ret          ""
                              num_spaces   -1
                              num_stars    7
                         ret          null
                         num_spaces   0
                         num_stars    5
                         spaces       ""
                         stars        "*****"
                         ret          null
                         num_spaces   1
 stack                   num_stars    3
                         spaces       " "
                         stars        "***"
                         ret          null
                         num_spaces   2
                         num_stars    1
                         spaces       "  "
                         stars        "*"
                              ret
                              n         3

heap

              repeat                  (symbol,n) => ...
 definitions  draw_pyramid_AUX  (num_spaces,num_stars) => ...
              draw_pyramid               (n) => ...
```

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globals			
		ret	null
		num_spaces	0
		num_stars	5
		spaces	""
		stars	"*****"
		ret	null
		num_spaces	1
		num_stars	3
stack		spaces	" "
		stars	"***"
		ret	null
		num_spaces	2
		num_stars	1
		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

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globals			
		ret	`"*****\n"`
		num_spaces	0
		num_stars	5
		spaces	`""`
		stars	`"*****"`
		ret	null
		num_spaces	1
		num_stars	3
stack		spaces	`" "`
		stars	`"***"`
		ret	null
		num_spaces	2
		num_stars	1
		spaces	`"  "`
		stars	`"*"`
		ret	
		n	3
heap			
	repeat	`(symbol,n) => ...`	
definitions	draw_pyramid_AUX	`(num_spaces,num_stars) => ...`	
	draw_pyramid	`(n) => ...`	

globals		
	ret	null
	num_spaces	1
	num_stars	3
	spaces	" "
	stars	"***"

stack		
	ret	null
	num_spaces	2
	num_stars	1
	spaces	" "
	stars	"*"
	ret	null
	n	3

heap		
definitions	repeat	(symbol,n) => ...
	draw_pyramid_AUX	(num_spaces,num_stars) => ...
	draw_pyramid	(n) => ...

globals		
	ret	" ***\n*****\n"
	num_spaces	1
	num_stars	3
	spaces	" "
	stars	"***"

stack		
	ret	null
	num_spaces	2
	num_stars	1
	spaces	" "
	stars	"*"
	ret	
	n	3

heap		
definitions	repeat	(symbol,n) => ...
	draw_pyramid_AUX	(num_spaces,num_stars) => ...
	draw_pyramid	(n) => ...

globals			
		ret	null
		num_spaces	2
		num_stars	1
stack		spaces	" "
		stars	"*"
		ret	null
		n	3
heap			
	repeat		(symbol,n) => ...
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...
	draw_pyramid		(n) => ...

globals			
		ret	" *\n ***\n*****\n"
		num_spaces	2
		num_stars	1
stack		spaces	" "
		stars	"*"
		ret	
		n	3
heap			
	repeat		(symbol,n) => ...
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...
	draw_pyramid		(n) => ...

globals			
stack		ret	null
		n	3
heap			
	repeat		(symbol,n) => ...
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...
	draw_pyramid		(n) => ...

globals			
stack		ret	" *\n ***\n*****\n"
		n	3
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	
globals			
stack			
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	
globals		res	
stack			
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	

print (" *\n ***\n*****\n")

globals		res	" *\n ***\n*****\n"
stack			
heap			
	repeat	(symbol,n) => ...	
definitions	draw_pyramid_AUX	(num_spaces,num_stars) => ...	
	draw_pyramid	(n) => ...	
output		" *\n ***\n*****\n"	

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