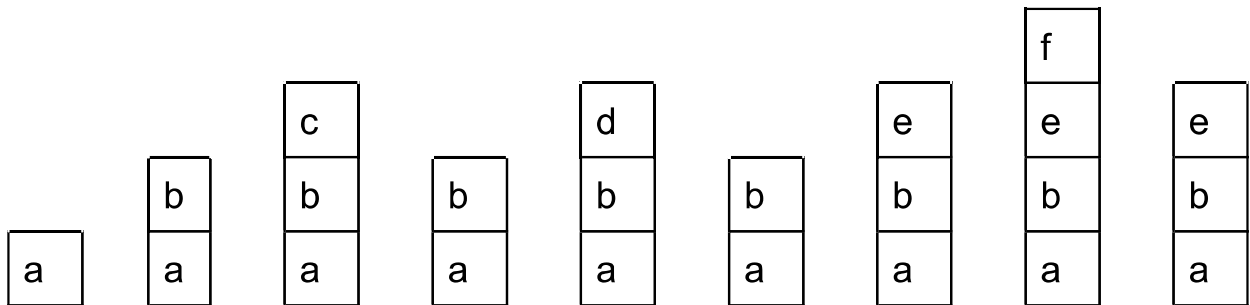# Tutorial: Stack
CSC 113

1. Consider the behavior of Stacks (LIFO), trace the following set of push( ) & pop( ) commands, showing the state of the stack with each step.
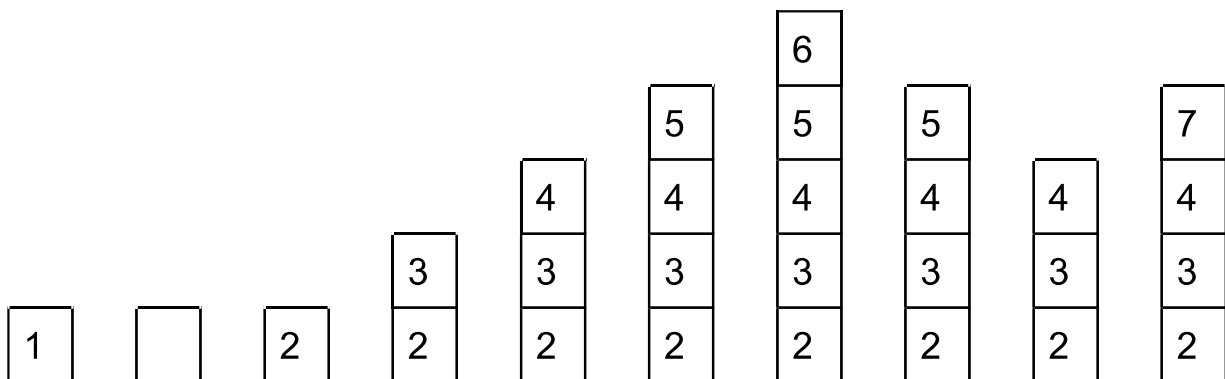   1. (starting with empty stack) push(a), push(b), push(c), pop( ), push (d), pop( ), push(e), push(f), pop( )
   2. (starting with empty stack) push(1), pop( ), push(2), push(3), push(4), push(5), push(6), pop( ), pop( ), push(7), push(8), pop( )
   3. (starting with empty stack) push("world"), push("yes"), push("no"), push("ok"), pop( ), push("maybe"), push("hi"), pop( ), pop( ), pop( ), pop( ), push("hello")

SOLUTION

1.1

		c		d		e	f	e
	b	b	b	b	b	b	e	b
a	a	a	a	a	a	a	b	a
							a	

1.2

					6			
			5	5	5	5		7
		4	4	4	4	4	4	4
	3	3	3	3	3	3	3	3
1	2	2	2	2	2	2	2	2

```
┌───┐
│ 8 │
├───┤   ┌───┐
│ 7 │   │ 7 │
├───┤   ├───┤
│ 4 │   │ 4 │
├───┤   ├───┤
│ 3 │   │ 3 │
├───┤   ├───┤
│ 2 │   │ 2 │
└───┘   └───┘
```

1.3

```
                                    ┌───────┐              ┌───────┐
                                    │ ok    │              │ maybe │
                          ┌───────┐ ├───────┤ ┌───────┐    ├───────┤
                          │ no    │ │ no    │ │ no    │    │ no    │
                ┌───────┐ ├───────┤ ├───────┤ ├───────┤    ├───────┤
                │ yes   │ │ yes   │ │ yes   │ │ yes   │    │ yes   │
      ┌───────┐ ├───────┤ ├───────┤ ├───────┤ ├───────┤    ├───────┤
      │ world │ │ world │ │ world │ │ world │ │ world │    │ world │
      └───────┘ └───────┘ └───────┘ └───────┘ └───────┘    └───────┘

┌───────┐
│ hi    │
├───────┤ ┌───────┐
│ maybe │ │ maybe │
├───────┤ ├───────┤ ┌───────┐
│ no    │ │ no    │ │ no    │
├───────┤ ├───────┤ ├───────┤ ┌───────┐              ┌───────┐
│ yes   │ │ yes   │ │ yes   │ │ yes   │              │ hello │
├───────┤ ├───────┤ ├───────┤ ├───────┤ ┌───────┐    ├───────┤
│ world │ │ world │ │ world │ │ world │ │ world │    │ world │
└───────┘ └───────┘ └───────┘ └───────┘ └───────┘    └───────┘
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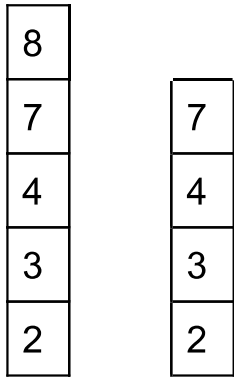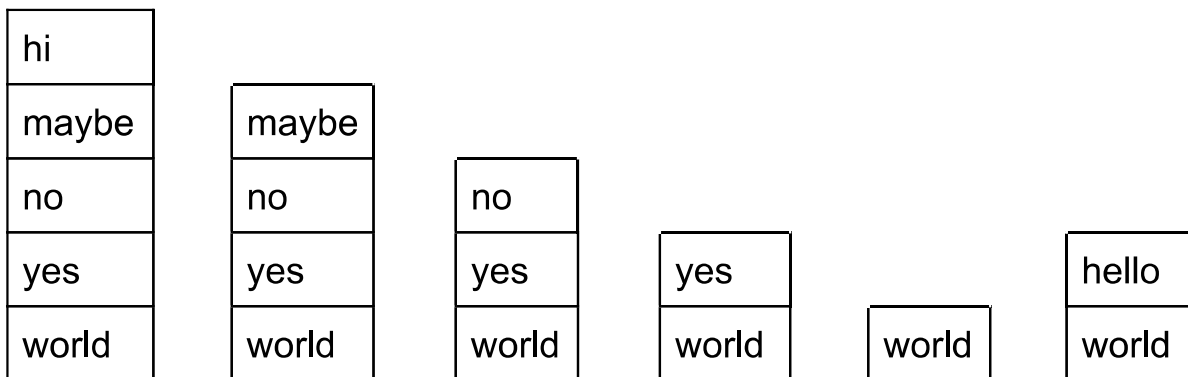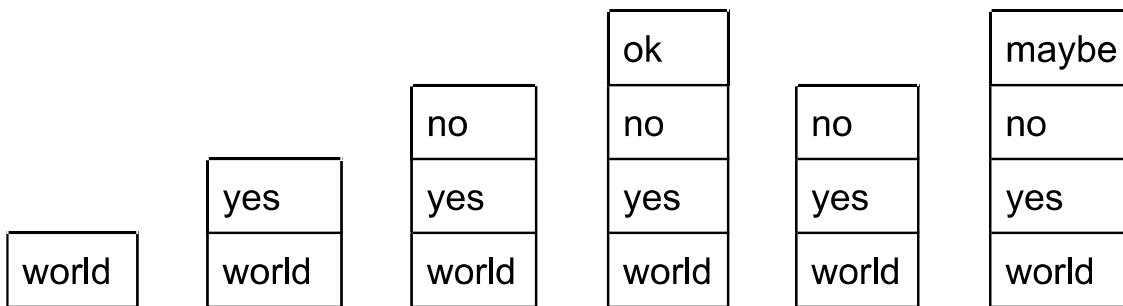
2. Print the sequence of the return values for each of the pop( ) operations in the previous question.

2.1 : c,d,f

2.2 : 1,6,5

2.3 : ok, hi, maybe, no, yes