## 1 Exercises

Exercise 1. Suppose that a minus sign in the input indicates pop the stack and write the return value to standard output, and any other string indicates push the string onto the stack. Further suppose that following input is processed:

```
it was - the best - of times - - - it was - the - - worst - of times -
```

a. What is written to standard output?
b. What are the contents (top to bottom) left on the stack?

Exercise 2. Consider the following code fragment:

```
s = Stack();
while n > 0:
    s.push(n % 2)
    n}=\textrm{n}/
while not s.isEmpty():
    stdio.write(s.pop())
stdio.writeln()
```

a. What does the following code fragment print when $n$ is 50 ?
b. Give a high-level description of what it does when presented with a positive integer n .

Exercise 3. Suppose that a minus sign in the input indicates dequeue the queue and write the return value to standard output, and any other string indicates enqueue the string onto the queue. Further suppose that following input is processed:

```
it was - the best - of times - - - it was - the - - worst - of times -
```

a. What is written to standard output?
b. What are the contents (head to tail) left on the queue?

Exercise 4. What does the following code fragment do to the queue q?

```
s = Stack()
while not q.isEmpty():
    s.push(q.dequeue())
while not s.isEmpty():
    q.enqueue(s.pop())
```

Exercise 5. Consider the following functions:

```
def f(x):
    st = SymbolTable()
    for i in range(1, x):
        st[i] = i
    return st
def g(x):
    return sum(f(x).values())
def h(x):
    y = 1
    for v in f(x).keys():
        y *= v
    return y
```

a. What is the value of the expression $f(6)[4]$ ?
b. What does $g(6)$ return?
c. What does $\mathrm{h}(6)$ return?
d. What is the value of the expression $g(6)+h(6)$ ?

## 2 Solutions to Exercises

## Solution 1.

a. was best times of the was the it worst times
b. of it

## Solution 2.

a. 110010
b. The binary representation of $n$

## Solution 3.

a. it was the best of times it was the worst
b. of times

Solution 4. Reverses the items on the queue.

## Solution 5.

a. 4
b. 15
c. 120
d. 135

