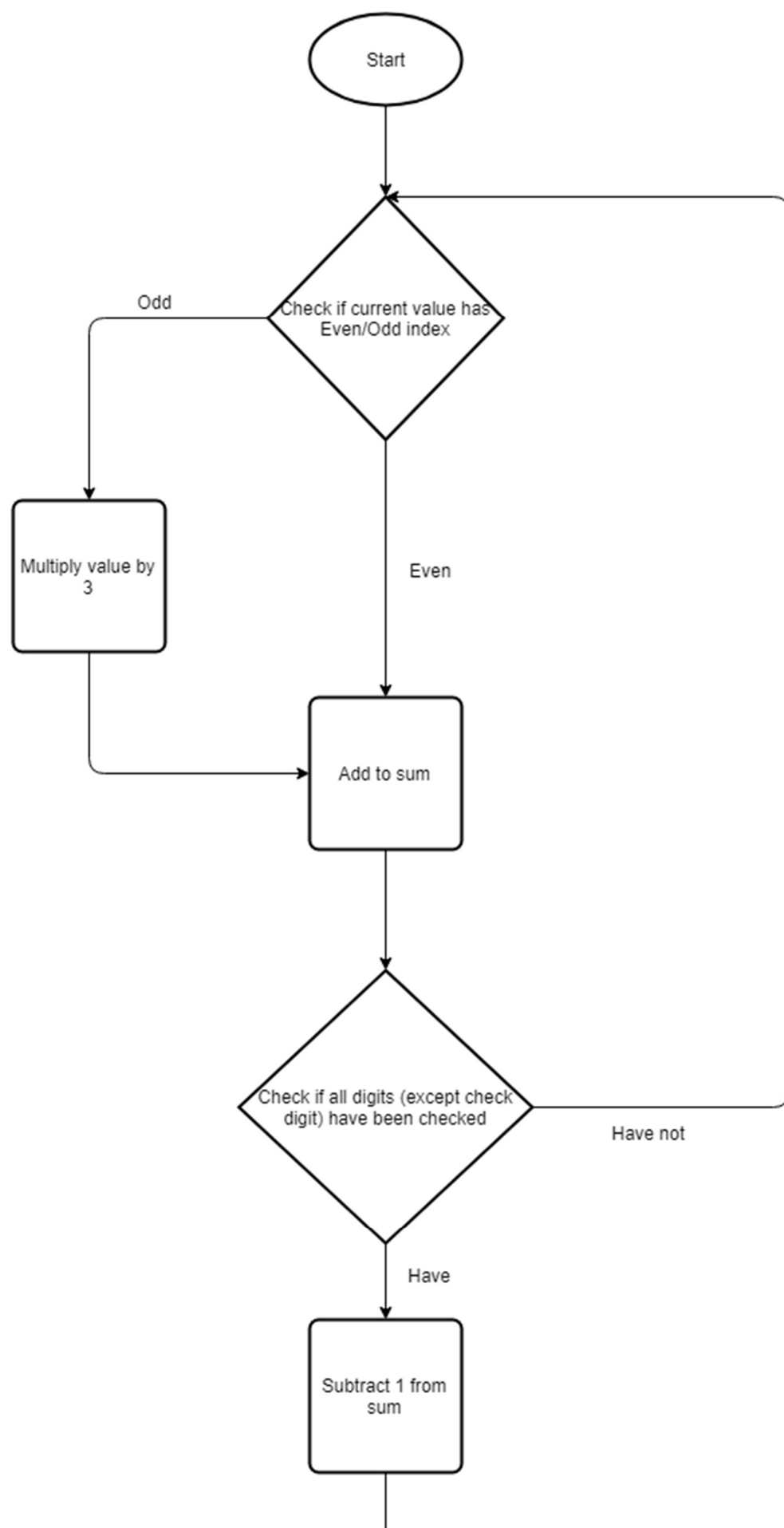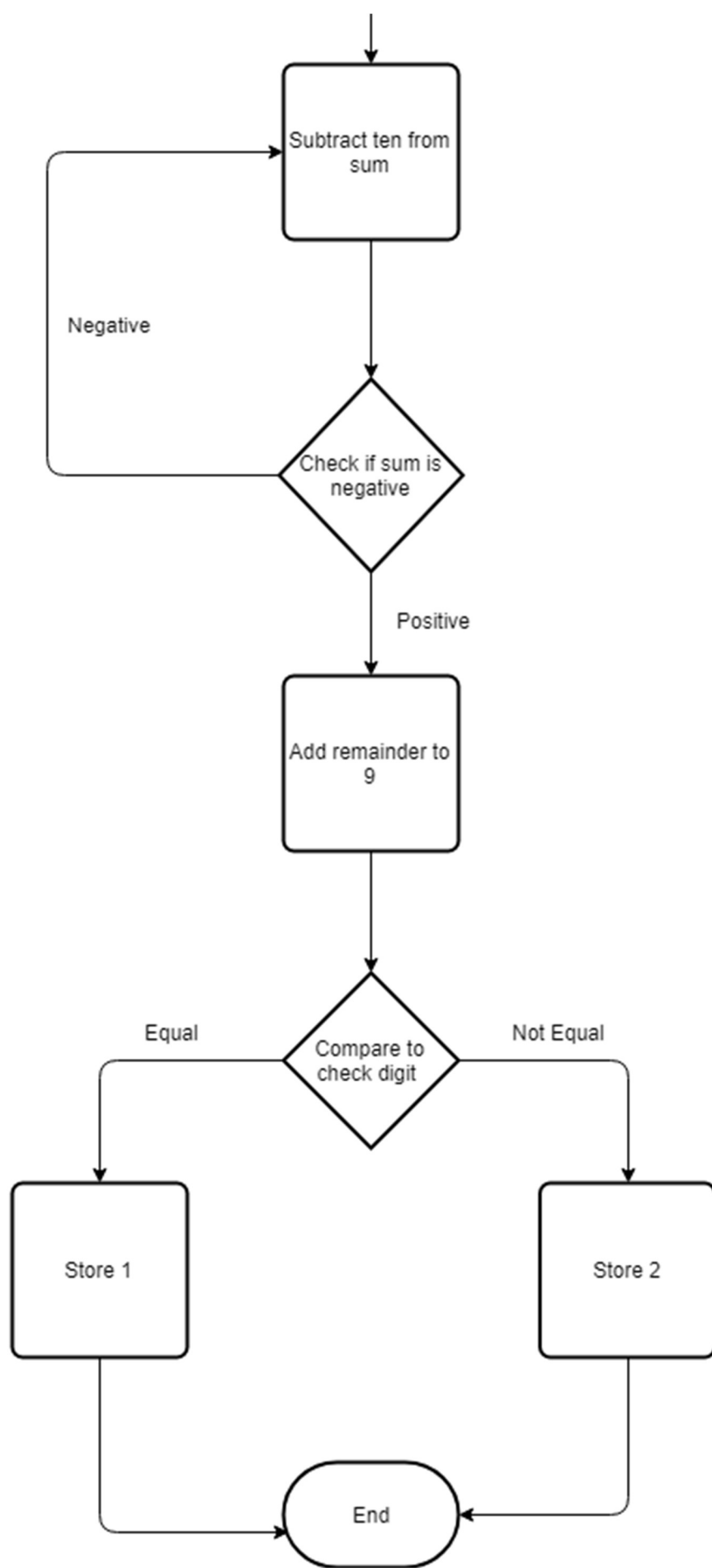Flowcharts

Assignment 3

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Question 1

Start

Check if current value has Even/Odd index

Odd → Multiply value by 3 → Add to sum

Even → Add to sum

Check if all digits (except check digit) have been checked

Have not

Have → Subtract 1 from sum

```
                          │
                          ▼
                  ┌───────────────┐
                  │ Subtract ten  │
          ┌──────▶│   from sum    │
          │       └───────┬───────┘
          │               │
          │               ▼
Negative  │              ╱ ╲
          │             ╱   ╲
          │            ╱Check╲
          └───────────◀ if sum ▶
                       ╲negative╱
                        ╲     ╱
                         ╲   ╱
                          ╲ ╱
                           │
                           │ Positive
                           ▼
                   ┌───────────────┐
                   │ Add remainder │
                   │     to 9      │
                   └───────┬───────┘
                           │
                           ▼
                          ╱ ╲
                         ╱   ╲
         Equal          ╱Compare╲       Not Equal
    ┌───────────────◀  ╲to check ▶───────────────┐
    │                   ╲ digit ╱                │
    │                    ╲     ╱                 │
    │                     ╲   ╱                  │
    │                      ╲ ╱                   │
    ▼                                            ▼
┌─────────┐                              ┌─────────┐
│ Store 1 │                              │ Store 2 │
└────┬────┘                              └────┬────┘
     │                                        │
     │              ╭─────────╮               │
     └─────────────▶│   End   │◀──────────────┘
                    ╰─────────╯
```

Question 2

```
                              ┌─────────┐
                              │  Start  │
                              └────┬────┘
                                   │
                         ┌─────────▼─────────┐
   ┌────────────────────►│   Load next       │◄────────────────────┐
   │                     │ character (from   │                     │
   │                     │      left)        │                     │
   │                     └─────────┬─────────┘                     │
   │                               │                               │
   │                          ◇────▼────◇                          │
   │                         ╱           ╲    True                 │
   │                        ◇ Does char val ═══════════════════┐   │
   │                         ╲   == EoS   ╱                     │   │
   │                          ◇────┬────◇                      │   │
   │                               │ False                     │   │
   │                          ◇────▼────◇                      │   │
   │         True            ╱           ╲                     │   │
   │  ┌────────────────────◇ Is char val > 0x61 (a)            │   │
   │  │                      ╲           ╱                     │   │
   │  │                       ◇────┬────◇                      │   │
   │  │                            │ False                     │   │
┌──▼──────────┐              ◇────▼────◇                      │   │
│ Subtract 0x20│            ╱           ╲     True             │   │
│ from the     │           ◇ Is char val > 0x5A (Z) ═══════════════┤   
│ character    ├──────────► ╲           ╱                     │   │
│ (convert to  │             ◇────┬────◇                      │   │
│ lowercase)   │                  │ False                     │   │
└──────────────┘            ◇────▼────◇                      │   │
   │                       ╱           ╲    True              │   │
   │                      ◇ Is char val < 0x41 (A) ═══════════════┤
   │                       ╲           ╱                      │   │
   │                        ◇────┬────◇                       │   │
   │                             │ False                      │   │
   │                             │                            │   │
   └─────────────────────────────                            │   │
```

Load next
character (from
right)

Is char val > 0x61 (a)

True

Subtract 0x20
from the
character
(convert to
lowercase)

False

Is char val > 0x5A (Z)

True

False

Is char val < 0x41 (A)

True

False

Does first char ==
second char

True

False

Mark string as invalid palindrome

Mark string as valid palindrome

End