Stats 102A - HW 1

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```
source("105195172_stats102a_hw1.R")
```

Problem 1

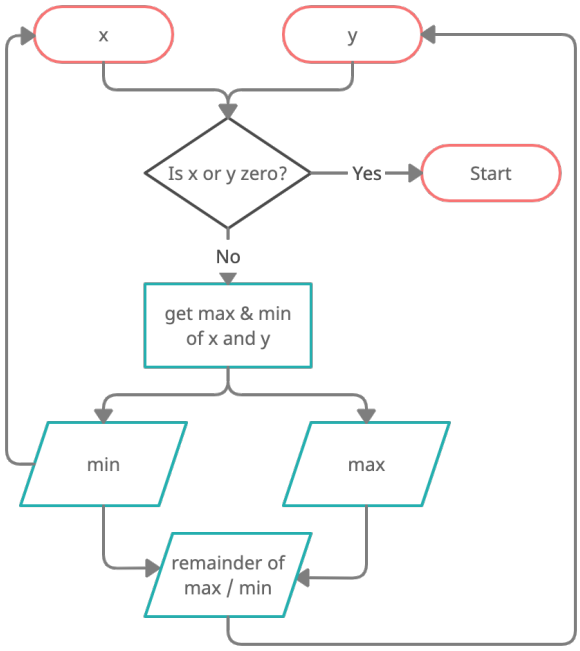

Figure 1: GCD Flowchart

Pseudocode for gcd(). Note GCD(a, b) = GCD(b, c) for c is remainder of a/b.

```
gcd(x, y):
  let a = larger of x, y
  let b = smaller of x, y
  let c = remainder of a/b
  return gcd(b, c)
```

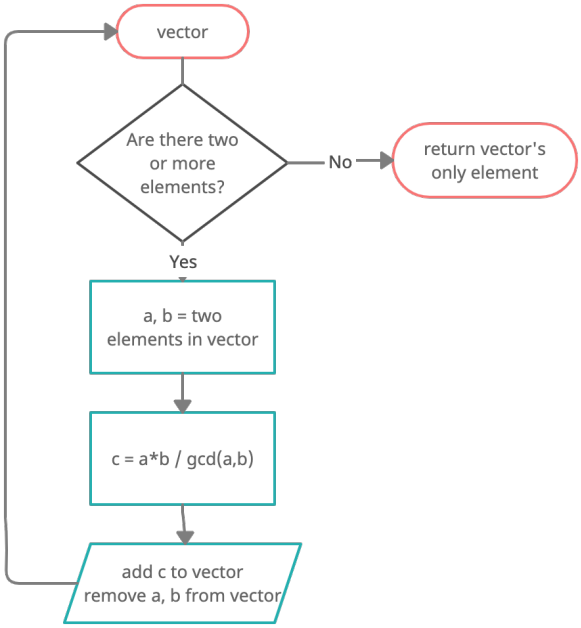

Figure 2: LCM Flowchart

Pseudocode for lcm(). Note LCM(a, b, c) = LCM(LCM(a, b), c).

```
lcm(nums):
  while length of nums >= 2:
      least = product of first two elements / gcd of first two elements
      remove first two elements of nums
      add least to nums
  return only element of nums
```

Problem 2

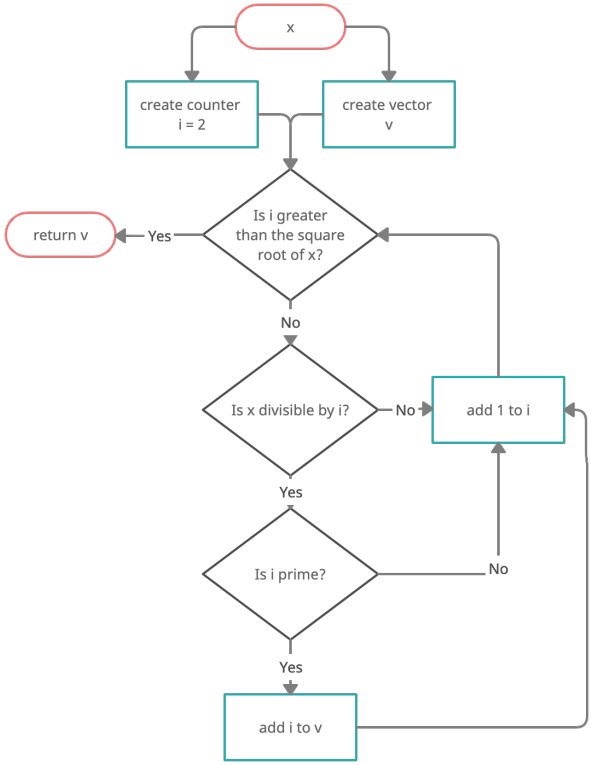

Figure 3: Get Factors Flowchart

Pseudocode for get_factors()

```
get_factors(x):
  init empty vector v
  for i = 2 to sqrt(x):
    if remainder of x/i is 0 AND i is prime:
      add i to v
  return v
```

Pseudocode for is_prime(x)

```
is_prime(x):
  if x is 0 or 1:
    return false
  for i = 2 to sqrt(n):
    if remainder of x/i is 0:
      return false
  return true
```

Test Cases

```
gcd(72, 8)
```

```
## [1] 8
```

```
gcd(12, 640)
```

```
## [1] 4
```

```
gcd(-1, 531)
```

```
## [1] 1
```

```
gcd(47011, 73618)
```

```
## [1] 1
```

```
lcm(c(12, 21))
```

```
## [1] 84
```

```
lcm(c(4789, 6123, 199))
```

```
## [1] 5835286353
```

```
get_factors(1920)
```

```
## [1] 2 3 5
```

```
get_factors(1.92)
```

```
## Error in get_factors(1.92): No prime factors. Please input positive integer over 2.
```

```
get_factors(-19)
```

```
## Error in get_factors(-19): No prime factors. Please input positive integer over 2.
```

```
is_prime(9)
```

```
## [1] FALSE
```

```
is_prime(c(2, 81, 13, 11, 109, 0, -1))
```

```
## [1]  TRUE FALSE  TRUE  TRUE  TRUE FALSE FALSE
```