

Aufgabenblatt 9: Reihungen (2)

Florian Ludewig (Übungsgruppe 2)

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Aufgabe 1 – Binäre Suche

a)

```
1 int linearSearch(int n, int a[], int l) {
2     for (int i = 0; i < l; i++) {
3         if (a[i] == n) return i;
4     }
5     return -1;
6 }
7
8 int binarySearch(int n, int a[], int l) {
9     int range_start = 0, range_end = l - 1;
10    while (1) {
11        int middle = (range_start + range_end) / 2;
12        if (a[middle] == n) return middle;
13        if (range_start > range_end) return -1;
14        if (a[middle] < n) range_start = middle + 1;
15        else range_end = middle - 1;
16    }
17 }
```

b)

```
1 int main(void) {
2     int n;
3     printf("Zahl eingeben: ");
4     scanf("%d", &n);
5
6     int primes[25] = {2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47,
7         53, 59, 61, 67, 71, 73, 79, 83, 89, 97};
8     int position_linear_search = linearSearch(n, primes, 25);
9     int position_binary_search = binarySearch(n, primes, 25);
10
11    printf("Suchergebnis der linearen Suche: %d\n", position_linear_search);
12    printf("Suchergebnis der binaeren Suche: %d\n", position_binary_search);
13
14 }
```

c)

```
1 int binarySearch(int n, int a[], int l) {
2     int* range_start = &a[0];
3     int* range_end = &a[l - 1];
4     while(1) {
5         if (range_start > range_end) return -1;
6         int* middle = ((range_end - range_start) / 2) + range_start;
7         if (*middle == n) return middle - &a[0];
8         if (*middle > n) range_end = middle - 1;
9         else range_start = middle + 1;
10    }
11 }
```

Aufgabe 2 – Magisches Quadrat

1 . . .