

# Aufgabenblatt 3

Florian Ludewig

November 11, 2019

## Aufgabe 1

a)

Ausdruck	Wert
<code>int x = 49;</code>	—
<code>!(x &gt;= 0 &amp;&amp; x &lt; 50    x &gt; 50 &amp;&amp; x &lt;= 100)</code>	<code>true</code>
<code>x++ == 49    x-- == 49</code>	<code>false</code>
<code>!(x &gt;= 0 &amp;&amp; x &lt; 50    x &gt; 50 &amp;&amp; x &lt;= 100)</code>	<code>true</code>
<code>int k; scanf("%d", &amp;k);</code>	—
<code>!(k &gt; 0 &amp;&amp; k%10 &lt;= 7) == (!(k &gt; 0)    !(k%10 &lt;= 7))</code>	<code>true</code>

b)

1) `!(m > 10) && (n != 0)`

2) `(x > 0) && (y > 0) && (z > 0) && (x % 5 == 0) && (y % 5 == 0) && (z % 5 == 0)`

3) `(a >= 1 && a <= 10) || (a < -7)`

4) `1 < 3`

## Aufgabe 2

```
1  #include <stdio.h>
2  #include <stdbool.h>
3  #include <stdlib.h>
4
5  struct station
6  {
7      int line;
8      int stop;
9  };
10
11 struct trip
12 {
13     struct station start;
14     struct station end;
15 };
16
17 bool validate_input(struct trip trip, int MIN, int MAX)
```

```

18 {
19     if (trip.start.line > MAX || trip.start.stop > MAX ||
20         trip.end.line > MAX || trip.end.stop > MAX ||
21         trip.start.line < MIN || trip.start.stop < MIN ||
22         trip.end.line < MIN || trip.end.stop < MIN)
23         return false;
24     return true;
25 }
26
27 bool is_short_trip(struct trip trip)
28 {
29     if ((trip.start.line == 5 && trip.start.stop == 2) &&
30         (trip.end.line == 4 && trip.end.stop == 2) ||
31         (trip.start.line == 4 && trip.start.stop == 2) &&
32         (trip.end.line == 5 && trip.end.stop == 2))
33         return false;
34
35     if ((trip.start.line == 0 && trip.start.stop == 0) &&
36         (trip.end.line == 2 && trip.end.stop == 1) ||
37         (trip.start.line == 2 && trip.start.stop == 1) &&
38         (trip.end.line == 0 && trip.end.stop == 0))
39         return false;
40
41     int stop_difference = abs(trip.start.stop - trip.end.stop);
42     if (stop_difference == 1)
43     {
44         if (trip.start.line == trip.end.line)
45             return true;
46         if (trip.start.stop == 0 && trip.end.stop == 1 ||
47             trip.start.stop == 1 && trip.end.stop == 0)
48             return true;
49     }
50
51     return false;
52 }
53
54 int count_zone_crosses(struct trip trip)
55 {
56     if (trip.start.stop > 2 && trip.end.stop > 2 &&
57         trip.start.line != trip.end.line)
58         return 2;
59     if (trip.start.stop > 2 && trip.end.stop < 3)
60         return 1;
61     if (trip.start.stop < 3 && trip.end.stop > 2)
62         return 1;
63     return 0;
64 }
65
66 int count_end_stops(struct trip trip)
67 {
68     int end_stops = 0;
69     if (trip.start.stop == 5)
70         end_stops++;
71     if (trip.end.stop == 5)
72         end_stops++;
73     return end_stops;
74 }
75
76 int main()
77 {

```

```

78     int start_input, end_input;
79     const int DEFAULT_PRICE = 3,
80             SHORT_TRIP_PRICE = 2,
81             END_STOP_PRICE = 1,
82             ZONE_CROSS_PRICE = 1;
83
84     printf("Starthaltestelle: ");
85     scanf("%d", &start_input);
86     printf("Zielhaltestelle: ");
87     scanf("%d", &end_input);
88
89     struct station start_station = {(start_input / 10) % 10, start_input % 10};
90     struct station end_station = {(end_input / 10) % 10, end_input % 10};
91     struct trip trip = {start_station, end_station};
92     if (!validate_input(trip, 0, 5))
93     {
94         printf("Invalid input\n");
95         return 1;
96     }
97
98     int price = 0;
99     if (!(trip.start.line == trip.end.line && trip.start.stop == trip.end.stop))
100    {
101        price = is_short_trip(trip) ? SHORT_TRIP_PRICE : DEFAULT_PRICE;
102        price += count_zone_crosses(trip) * ZONE_CROSS_PRICE;
103        price += count_end_stops(trip) * END_STOP_PRICE;
104    }
105    printf("%d Euro\n", price);
106    return 0;
107 }

```