

Lösung: Übungsaufgaben Blatt 2 - Variablen, Funktionen und Kommentare

Programmieren 1 - Prof. Dr. Markus Heckner

Aufgabe 1 : Karel und die Diamantenmine

```

1  /*
2   * File: DiamondMining.c
3   * -----
4   *
5   * In this program, Karel removes diamonds from various mines.
6   *
7   */
8
9  #include "karel.h"
10
11 void setup() {
12     loadWorld("DiamondMining1");
13 }
14
15 void turnRight() {
16     turnLeft();
17     turnLeft();
18     turnLeft();
19 }
20
21 void turnAround() {
22     turnLeft();
23     turnLeft();
24 }
25
26 void collectDiamond() {
27     if(beepersPresent()) {
28         pickBeeper();
29     }
30 }
31
32 /*
33  * pre-condition: karel stands on top of tunnel, facing right
34  * post-condition: karel stands at bottom, facing right
35  */
36 void clearDownwardsTunnel() {
37     turnRight();

```

```

38     while(frontIsClear()) {
39         collectDiamond();
40         move();
41     }
42     collectDiamond();
43     turnLeft();
44 }
45
46 /*
47  *pre-condition: karel stands at bottom, facing right
48  *post-condition: karel stands at bottom, facing right
49  */
50 void clearRightTunnel() {
51     while(frontIsClear()) {
52         collectDiamond();
53         move();
54     }
55     collectDiamond();
56 }
57
58 /*
59  * pre-condition: karel stands at bottom left edge, facing
    right
60  * post-condition: karel stands on top, one field after tunnel,
    facing right
61  */
62 void climbUp() {
63     while(leftIsBlocked()) {
64         move();
65     }
66     turnLeft();
67     move();
68     while(rightIsBlocked()) {
69         move();
70     }
71     turnRight();
72     move();
73 }
74
75 /*
76  * pre-condition: karel stands at bottom, facing right
77  * post-condition: karel stands at bottom left edge, facing
    right
78  */
79 void clearLeftTunnel() {
80     turnAround();
81     while(frontIsClear()) {
82         move();
83         collectDiamond();

```

```

84     }
85     collectDiamond();
86     turnAround();
87 }
88
89 /* pre-condition: karel stands over mine-tunnel, facing right
90  * post-condition: Karel stands on field after mine-tunnel,
91   facing right
92  */
93
94 void emptyDiamondMine() {
95     clearDownwardsTunnel();
96     clearRightTunnel();
97     clearLeftTunnel();
98     climbUp();
99 }
100
101 void run() {
102     while(frontIsClear()) {
103         if(rightIsClear()) {
104             emptyDiamondMine();
105         } else {
106             move();
107         }
108     }
109 }

```

Aufgabe 2 : Histogramm

```

1  #include "simpio.h"
2
3  void printHistogram(int numTotalStars) {
4      for (int starNumber = 0; starNumber < numTotalStars;
5           starNumber++) {
6          printf("*");
7      }
8      printf("\n");
9  }
10
11 int main() {
12     int firstNum = 0;
13     int secondNum = 0;
14     int thirdNum = 0;
15     int fourthNum = 0;
16     int fifthNum = 0;
17

```

```
18 printf("Please enter five numbers (press Enter for next
    number): \n");
19 firstNum = getInteger();
20 secondNum = getInteger();
21 thirdNum = getInteger();
22 fourthNum = getInteger();
23 fifthNum = getInteger();
24
25 printf("Printing histogram:\n");
26 printHistogram(firstNum);
27 printHistogram(secondNum);
28 printHistogram(thirdNum);
29 printHistogram(fourthNum);
30 printHistogram(fifthNum);
31 return 0;
32 }
```