```
1     /*****************************************************************/
2     /*                                        2004/08/13/            */
3     /*                                        2008/05/13/ revised    */
4     /*                                                               */
5     /*                                        Masazumi Kurihara      */
6     /*                                                               */
7     /*             拡張 Euclid algorihtm                             */
8     /*
9
10    17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 97 101 103
11    107 109 113 127 131 137 139 149 151 157 163 167 173 179 181 191
12    193 197 199 211 223 227 229 233 239 241 251
13                                                                  */
14    /*****************************************************************/
15
16    #include <stdio.h>
17
18    main()
19    {
20      long a;
21      long b;
22      long f0,f1,f2;
23      long g0,g1,g2;
24      long r0,r1,r2;
25      long q,r;
26      long i,j;
27      long e;
28      long cnt=0;
29
30      printf("...start Euclid algorithm for finding gcd(a,b). \n");
31      printf(" Input two numbers a and b where a > b such as 144 5 : ");
32      scanf("%d %d",&a, &b);              /* a と b の値の指定 */
33
34      f0=1;  /* 初期値の設定 */
35      f1=0;
36      g0=0;
37      g1=1;
38      r0=a;
39      r1=b;
40
41      printf("-------------------------------------------------------------\n");
42      printf("  i :        f_i         g_i         r_i         q_i\n");
43      printf("-------------------------------------------------------------\n");
44      printf(" -1 : %10ld  %10ld  %10ld          -  \n",f0,g0,r0);
45      printf("-------------------------------------------------------------\n");
46      printf("  0 : %10ld  %10ld  %10ld          -  \n",f1,g1,r1);
47      printf("-------------------------------------------------------------\n");
48
49      while( r1 != 0){ /* 剰余 r が零になるまで以下の更新の操作を繰り返す */
50
51        cnt=cnt+1;
52
53        r2 = r0%r1;                  /*剰余の計算*/
54        q = (r0 - r2)/r1;            /*整商の計算*/
55
56        f2 = f0 - q*f1;             /*f,gの更新*/
57        g2 = g0 - q*g1;
58
59        printf("%3d : %10ld  %10ld  %10ld  %10ld\n",cnt, f2,g2,r2,q);
60      printf("-------------------------------------------------------------\n");
61
62      if( r2 == 0 ){    /* 剰余が 0 になったときに d,f,g を出力 */
63          printf("\n");
64          printf("          d = gcd(a,b) = gcd(%10ld , %10ld) = %10ld\n", a,b,r1);
65          printf("\n");
66          printf("          ( f * a) + (g * b) = d \n");
```



```
67          printf("\n");
68          printf("  (%10ld * %10ld)+(%10ld * %10ld) = %10ld\n", f1,a,g1,b,r1);
69          printf("\n");
70          printf("          (f,g%)=(%10ld, %10ld)\n", f1,g1);
71          printf("\n");
72
73      }
74
75        f0=f1;                     /*r,f,gの更新*/
76        f1=f2;
77        g0=g1;
78        g1=g2;
79        r0=r1;
80        r1=r2;
81      }
82      printf("...end of Euclid algorithm.\n");
83    }
84
85    /*****************************************************/
86    /*
87
88    IED: gcc -o euc euclid2.c
89    IED: euc
90    ...start Euclid algorithm for finding gcd(a,b).
91     Input two numbers a and b where a > b such as 144 5 : 144 5
92    -------------------------------------------------------------
93      i :        f_i         g_i         r_i         q_i
94    -------------------------------------------------------------
95     -1 :          1           0         144          -
96    -------------------------------------------------------------
97      0 :          0           1           5          -
98    -------------------------------------------------------------
99      1 :          1         -28           4          28
100   -------------------------------------------------------------
101     2 :         -1          29           1           1
102   -------------------------------------------------------------
103     3 :          5        -144           0           4
104   -------------------------------------------------------------
105
106             d = gcd(a,b) = gcd(       144 ,          5) =          1
107
108             ( f * a) + (g * b) = d
109
110     (        -1 *        144)+(        29 *          5) =          1
111
112             (f,g)=(        -1,         29)
113
114   ...end of Euclid algorithm.
115   IED:
116
117   */
118   /*****************************************************/
```