מטלה 0 מבוא לחישוב

מיכאל ספקטור 325112738

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1) Explanation for the algorithm

The algorithm gets 2 natural numbers and finds the greatest prime common divisor. The algorithm works by finding the GCD of the numbers, then finding the prime divisors of that GCD, and printing the largest of the prime divisors.

2) Pseudo Code

```
a)  Input(a>1)                          //assuming a is a natural number a>0
b)  Input(b>1)                          //assuming b is a natural number b>0
c)  gcd                                 //gcd is the value representing the greatest common divisor
d)  for(i=1; i<=a and i<=b; i++){       //loop over all numbers that are between 1 and the lowest of a or b
e)      if(a%i==0 and b%i==0){          //if both numbers can divide by I, it is a common divisor
f)          gcd = I                     //change the value of gcd to the current i
g)      }//if                           //the end of the "if" block
h)  }//for                              //the end of the "for" block, here the highest common divisor is in gcd
i)  Primes (List)                       //create a list and call it primes that will represt all the primes that gcd is divided by
j)  While(gcd%2 == 0){                  //loop over until gcd is an odd number
k)      Primes.append(2)                //append the number 2 to the end of the Primes list
l)      gcd /= 2                        //Divide gcd by 2 until it does not divide by 2 natively
m)  }//while                            //the end of the "while" block
n)  For(i=3; i<=sqrt(gcd); i+=2){       //loop over all the numbers that are between 3 and the square root of gcd
o)      While(gcd%i == 0){              //loop over gcd until it does not divide by I natively
p)          Primes.append(i)            //append I (the prime number) into Primes
q)          gcd = gcd/I                 //divide gcd by the prime number that was appended
r)      }//while                        //end of "while" block
s)  }//for                              //end of "for" block
t)  If(n>2){                            //if the last number (gcd) that is left is higher than 2
u)      Primes.append(gcd)              // append gcd to Primes
v)  }//if                               //end of "if" block
w)  GPCD = Primes[0]                    //put into GPCD
x)  For(i=1; i<Primes.Length; i++){     //loop over the length of Primes list
y)      If(Primes[i] > GPCD){           //if the prime number in i spot in the list is bigger than current GPCD
z)          GPCD = Primes[i]            //put the prime number as the current GPCD
aa)     }//if                            //end of "if" block
bb) }//for                              //end of "for" block
cc) Print(GPCD)                         //print the greatest prime common divisor of a and b
```