import java.util.\*;

/\*\* To reduce the rational numbers and to perform basic arithmethic operations

\*/

/\*\*

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\*/

class operation

{

/\*\* class variables

\*/

int a,b;

/\*\*

@author v.vaishnavi

\*/

/\*\* constructor to initialise the values passed to the class variables

@param x -numerator

@param y -denominator

\*/

public operation(int x,int y)

{

a=x;

b=y;

}

/\*\* display method is to display the entered number in the form of a rational number\*/

public void display()

{

System.out.println("the rational number is "+a+"/"+b);

}

/\*\*

Using the euclid's method check value for temp i.e

divide the numerator and denominator and store it in temp

until it is not equal to 0 run a loop..

@param number1 -numerator

@param number2 -denominator

@return -returns the gcd of the two numbers

\*/

public int gcd(int number1,int number2)

{

if(number2==0)

{return number1;}

return gcd(number2,number1%number2);

}

/\*\* Reduce() method reduces the rational numbers to least fractional values

Using the euclid's method check value for temp i.e

divide the numerator and denominator and store it in temp

until it is not equal to 0 run a loop..

display the reduced fractions

@param number1 -numerator

@param number2 -denominator

@param c -it is the gcd of the two numbers(numerator and denominator)

\*/

public void reduce(int number1,int number2,int c)

{

if(number2==0)

System.out.println("\n invalid rational number");

else

{

number1=number1/c;

number2=number2/c;

System.out.println("the reduced rational number is..."+number1+"/"+number2);

}//else close

}

/\*\* performs addition of the two numbers

@param a numerator of the first rational number

@param b denominator of the first rational number

@param c numerator of the second rational number

@param d denominator of the second rational number

\*/

public void add(int a,int b,int c,int d)

{

int deno=b\*d;

int num=a\*d+b\*c;

System.out.println("the rational number is "+num+"/"+deno);

int cd1=gcd(num,deno);

System.out.println("the gcd of the two numbers is"+cd1);

reduce(num,deno,cd1);

}

/\*\* performs subtraction of two rational numbers

@param a numerator of the first rational number

@param b denominator of the first rational number

@param c numerator of the second rational number

@param d denominator of the second rational number

\*/

public void sub(int a,int b,int c,int d)

{

int deno=b\*d;

int num=(a\*d)-(b\*c);

System.out.println("the rational number is "+num+"/"+deno);

int cd1=gcd(num,deno);

System.out.println("the gcd of the two numbers is"+cd1);

reduce(num,deno,cd1);

}

/\*\* performs multiplication of two rational numbers

@param a numerator of the first rational number

@param b denominator of the first rational number

@param c numerator of the second rational number

@param d denominator of the second rational number

\*/

public void mul(int a,int b,int c,int d)

{

int deno=(b\*d);

int num=(a\*c);

System.out.println("the rational number is "+num+"/"+deno);

int cd1=gcd(num,deno);

System.out.println("the gcd of the two numbers is"+cd1);

reduce(num,deno,cd1);

}

/\*\* performs division of two rational numbers

@param a numerator of the first rational number

@param b denominator of the first rational number

@param c numerator of the second rational number

@param d denominator of the second rational number

\*/

public void div(int a,int b,int c,int d)

{

int deno=(b\*c);

int num=(a\*d);

System.out.println("the rational number is "+num+"/"+deno);

int cd1=gcd(num,deno);

System.out.println("the gcd of the two numbers is"+cd1);

reduce(num,deno,cd1);

}

}

public class Rationalnum1

{

public static void main(String l[])

{

Scanner s1=new Scanner(System.in);

System.out.println("Enter the first number to find GCD");

int number1=s1.nextInt();

System.out.println("Enter the second number to find GCD");

int number2=s1.nextInt();

operation op=new operation(number1,number2);

op.display();

int cd=op.gcd(number1,number2);

System.out.println("the gcd of the two numbers is"+cd);

op.reduce(number1,number2,cd);

do{

System.out.println("\n\n1.ARITHMETIC OPERATIONS 2.EXIT\n\n");

System.out.println("enter the choice");

int choice=s1.nextInt();

switch(choice)

{

case 1:

{

//first fraction

System.out.println("Enter the first number");

int a=s1.nextInt();

System.out.println("Enter the second number");

int b=s1.nextInt();

System.out.println("the first rational number is "+a+"/"+b);

//second fraction

System.out.println("Enter the third number");

int c=s1.nextInt();

System.out.println("Enter the fourth number");

int d=s1.nextInt();

System.out.println("the second rational number is "+c+"/"+d);

System.out.println("Enter the option\n1.add\n2.sub\n3.mul\n4.div\n");

int e=s1.nextInt();

//perform addition

if(e==1)

{

op.add(a,b,c,d);

}

//perform subtraction

if(e==2)

{

op.sub(a,b,c,d);

}

//perform multiplication

if(e==3)

{

op.mul(a,b,c,d);

}

//perform division

if(e==4)

{

op.div(a,b,c,d);

}

break;

}

default:

{

System.out.println("\nerror!");

System.exit(1);

break;

}

}//switch close

}while(true);

}//method close

}//class close

SAMPLE INPUT AND OUTPUT:

Microsoft Windows [Version 6.1.7601]

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C:\Users\dell>cd..

C:\Users>cd..

C:\>cd java

C:\java>set path=%path%;C:\java\Java\jdk1.7.0\_21\bin

C:\java>javac Rational.java

C:\java>javac Rationalnum1.java

C:\java>java Rationalnum1

Enter the first number to find GCD

24

Enter the second number to find GCD

54

the rational number is 24/54

the gcd of the two numbers is6

the reduced rational number is...4/9

1.ARITHMETIC OPERATIONS 2.EXIT

enter the choice

1

Enter the first number

1

Enter the second number

2

the first rational number is 1/2

Enter the third number

3

Enter the fourth number

4

the second rational number is 3/4

Enter the option

1.add

2.sub

3.mul

4.div

5.decimals

3

the rational number is 3/8

the gcd of the two numbers is1

the reduced rational number is...3/8

1.ARITHMETIC OPERATIONS 2.EXIT

enter the choice

1

Enter the first number

2

Enter the second number

3

the first rational number is 2/3

Enter the third number

4

Enter the fourth number

5

the second rational number is 4/5

Enter the option

1.add

2.sub

3.mul

4.div

5.decimals

4

the rational number is 10/12

the gcd of the two numbers is2

the reduced rational number is...5/6

1.ARITHMETIC OPERATIONS 2.EXIT

enter the choice

1

Enter the first number

1

Enter the second number

2

the first rational number is 1/2

Enter the third number

3

Enter the fourth number

4

the second rational number is 3/4

Enter the option

1.add

2.sub

3.mul

4.div

5.decimals

1

the rational number is 10/8

the gcd of the two numbers is2

the reduced rational number is...5/4

1.ARITHMETIC OPERATIONS 2.EXIT

enter the choice

1

Enter the first number

1

Enter the second number

2

the first rational number is 1/2

Enter the third number

3

Enter the fourth number

4

the second rational number is 3/4

Enter the option

1.add

2.sub

3.mul

4.div

5.decimals

2

the rational number is -2/8

the gcd of the two numbers is-2

the reduced rational number is...1/-4

1.ARITHMETIC OPERATIONS 2.EXIT

enter the choice

1

Enter the first number

1

Enter the second number

2

the first rational number is 1/2

Enter the third number

3

Enter the fourth number

4

the second rational number is 3/4

Enter the option

1.add

2.sub

3.mul

4.div

5.decimals

1

the rational number is 10/8

the gcd of the two numbers is2

the reduced rational number is...5/4

1.ARITHMETIC OPERATIONS 2.EXIT

enter the choice

1

Enter the first number

1

Enter the second number

3

the first rational number is 1/3

Enter the third number

4

Enter the fourth number

5

the second rational number is 4/5

Enter the option

1.add

2.sub

3.mul

4.div

5.decimals

5

2.4

1.2

the gcd of the two numbers is120000

the reduced rational number is...1/2

1.ARITHMETIC OPERATIONS 2.EXIT

enter the choice 2