Number system

Assignment Solutions

PW SKILLS

Q1 - Convert a decimal number into binary

Input:
56

Expected Output:
111000

Code:

```
import java.util.Scanner;
public class Test {
   public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    System.out.println("Enter the decimal number: ");
    int n = scn.nextInt();
    int binarynum = 0;
    int power = 1;
    while(n != 0){
        int rem = n % 2;
        binarynum += rem * power;
        power *= 10;
        n /= 2;
    }
    System.out.print(binarynum);
   }
}
```

```
56
111000
Process finished with exit code 0
```

Q2 - Convert a binary number to decimal

Input:
10100011

Expected Output:
163

Code:

```
import java.util.Scanner;
public class Test {
   public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    System.out.println("Enter the binary number: ");
    int n = scn.nextInt();
    int decimalnum = 0;
    int power = 1;
    while(n != 0){
        int rem = n % 2;
        decimalnum += rem * power;
        power *= 2;
        n /= 10;
    }
    System.out.print(decimalnum);
   }
}
```

```
10100011
163
Process finished with exit code 0
```

Q3 - Add two numbers given in different base

Input: 1st number is decimal, 2nd number is binary
43
10100011

Expected Output:
206

Code:

```
import java.util.Scanner;
public class Test {
   public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    System.out.println("Enter the decimal number: ");
    int m = scn.nextInt();
    System.out.println("Enter the binary number: ");
    int n = scn.nextInt();
    int decimalnum = 0;
    int power = 1;
    while(n != 0){//convert binary number to decimal, and print the sum of the two decimal
numbers
        int rem = n % 2;
        decimalnum += rem * power;
        power *= 2;
        n /= 10;
    }
    System.out.print(m+decimalnum);
   }
}
```

```
43
10100011
206
Process finished with exit code 0
```

Q4 - Multiply two numbers given in different base

Input: 1st number is decimal, 2nd number is binary
43
10100011

Expected Output:
7009

Code:

```
import java.util.Scanner;
public class Test {
   public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    System.out.println("Enter the decimal number: ");
    int m = scn.nextInt();
    System.out.println("Enter the binary number: ");
    int n = scn.nextInt();
    int decimalnum = 0;
    int power = 1;
    while(n != 0){ //convert binary number to decimal, and print the product of the two
decimal numbers
        int rem = n % 2;
        decimalnum += rem * power;
        power *= 2;
        n /= 10;
    }
    System.out.print(m*decimalnum);
   }
}
```

```
43
10100011
7009
Process finished with exit code 0
```

Q5 - Convert a decimal double number into binary string for upto k precision digits

Input:
18.625
3

Expected Output:(in string format)
10010.101

Code:

```
import java.util.Scanner;
public class Test {
   public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    System.out.println("Enter the decimal double number: ");
    double n = scn.nextDouble();
    System.out.println("Enter the number of precision digits: ");
    int k = scn.nextInt();
    int decimal_n = (int)n; //separate the integer and fractional part of the double number
    double fractional_n = n - decimal_n;
    int decimal_binary = 0;
    int power = 1;
    while(decimal_n != 0) { //normally convert the integer part to binary
        int rem = decimal_n % 2;
        decimal_binary += rem * power;
        power *= 10;
        decimal_n /= 2;
    }
    String s = Integer.toString(decimal_binary) + ".";
    while(k > 0 && fractional_n != 0){ //digits of fractional part to be multiplied by 2
until it becomes 0
        fractional_n *= 2;
        int digit = (int)fractional_n; //the integer part of this becomes digits of
fractional part of binary number
        s += digit;
        fractional_n = fractional_n - digit; //update fractional part to leftover part after
removing integer
        k--; //do this until k digits have been obtained for the fractional part
    }
    System.out.print(s);
   }
}
```

```
18.675
3
10010.101
Process finished with exit code 0
```