CPSC 1301, Computer Science I Lab Assignment

Lab 04b

Problem 1

Write a Python program that accepts an integer as a command line argument as a limit and prints powers of 2 to that limit.

```
C:\Users\ccc31\cols-st\cpsc1301\tests>a33_powers.py 10
0 1
1 2
2 4
3 8
4 16
5 32
6 64
7 128
8 256
9 512
10 1024
```

Problem 2

Write a Python program that accepts an integer n as a command line argument and prints a $n \times n$ table. Print an asterisk (*) in each row and column where either the row or column is divisible by the other.

```
C:\Users\ccc31\cols-st\cpsc1301\tests>a34_divisor.py 7
1 2 3 4 5 6 7
* * * * * * * 1
* *   *   *   2
*   *     *   3
* *   *       4
*       *     5
* * *     *   6
*           * 7
```

Problem 3

In mathematics, the n-th harmonic number is the sum of the reciprocals of the first n natural numbers. Write a Python program that accepts an integer as a command line argument and prints the *nth* harmonic number.

$$H_n = \sum_{i=1}^{i=n} \frac{1}{i} \tag{1}$$

```
C:\Users\ccc31\cols-st\cpsc1301\tests>a35_harmonic.py 8
2.7178571428571425

C:\Users\ccc31\cols-st\cpsc1301\tests>a35_harmonic.py 1
1.0

C:\Users\ccc31\cols-st\cpsc1301\tests>a35_harmonic.py 2
1.5

C:\Users\ccc31\cols-st\cpsc1301\tests>a35_harmonic.py 4
2.083333333333333

C:\Users\ccc31\cols-st\cpsc1301\tests>a35_harmonic.py 9
2.8289682539682537
```

Problem 4

Write a Python program that accepts an integer *num* as a command line argument and computes the square root of n.

```
C:\Users\ccc31\cols-st\cpsc1301\tests>a36_sqrt.py 2
1.414213562373095

C:\Users\ccc31\cols-st\cpsc1301\tests>a36_sqrt.py 3
1.7320508075688772

C:\Users\ccc31\cols-st\cpsc1301\tests>a36_sqrt.py 4
2.0

C:\Users\ccc31\cols-st\cpsc1301\tests>a36_sqrt.py 9
3.0
```

Problem 5

Write a Python program that accepts a positive integer as a command line argument and prints the equivalent binary number.

```
C:\Users\ccc31\cols-st\cpsc1301\tests>a37_binary.py 10
1010

C:\Users\ccc31\cols-st\cpsc1301\tests>a37_binary.py 15
1111

C:\Users\ccc31\cols-st\cpsc1301\tests>a37_binary.py 65
1000001
```

Problem 6

Write a Python program that computes Euler's number, e.

```
C:\Users\ccc31\cols-st\cpsc1301\tests>a37a_e.py
Computing e
e is 2.7182818284590455
```