

Challenge Problem: Perfect Numbers

Source: Western Carolina University

A number (consider only positive integers) is **perfect** if it is equal to the sum of its proper divisors. For example, 6 is a perfect number, because its proper divisors are 1, 2, and 3 (note that we do not include the number itself), and $1 + 2 + 3 = 6$.

A number is **deficient** if the sum of its proper divisors is less than the number. For example, 8 is deficient, because its proper divisors are 1, 2, and 4, and $1 + 2 + 4 = 7$, which is less than 8.

A number is **abundant** if the sum of its proper divisors is greater than the number. For example, 12 is abundant, because $1 + 2 + 3 + 4 + 6 = 16$, which is greater than 12.

Write a program that prompts the user for a number, then determines whether the number is perfect, deficient, or abundant. Your program should continue to prompt the user for numbers until a 0 is provided as input. An example session:

```
Enter an integer (0 to quit): 7
7 is deficient.
```

```
Enter an integer (0 to quit): 12
12 is abundant.
```

```
Enter an integer (0 to quit): 6
6 is perfect.
```

```
Enter an integer (0 to quit):
0 Goodbye!
```

MIT OpenCourseWare
<http://ocw.mit.edu>

EC.S01 Internet Technology in Local and Global Communities
Spring 2005-Summer 2005

For information about citing these materials or our Terms of Use, visit: <http://ocw.mit.edu/terms>.