

CHEM 3PC3

Coding exercises

September 1, 2026

Name: _____

Student Number: _____

1 Problem

1. Given an integer n , return **true** if it is a power of two. Otherwise, return **false**.
An integer n is a power of two if there exists an integer x such that $n = 2^x$.

Example 1

Input: $n = 1$

Output: **true**

Explanation: $2^0 = 1$.

Example 2

Input: $n = 16$

Output: **true**

Explanation: $2^4 = 16$.

Example 3

Input: $n = 3$

Output: **false**

2. You are given an integer n , the number of teams in a tournament that has strange rules:

- If the current number of teams is even, each team gets paired with another team. A total of $n / 2$ matches are played, and $n / 2$ teams advance to the next round.
- If the current number of teams is odd, one team randomly advances in the tournament, and the rest gets paired. A total of $(n - 1) / 2$ matches are played, and $(n - 1) / 2 + 1$ teams advance to the next round.

Return the number of matches played in the tournament until a winner is decided.

Example 1

Input: $n = 7$

Output: 6

Explanation: Details of the tournament:

- 1st Round: Teams = 7, Matches = 3, and 4 teams advance.
- 2nd Round: Teams = 4, Matches = 2, and 2 teams advance.
- 3rd Round: Teams = 2, Matches = 1, and 1 team is declared the winner.

Total number of matches = $3 + 2 + 1 = 6$.

Example 2

Input: $n = 14$

Output: 13

Explanation: Details of the tournament:

- 1st Round: Teams = 14, Matches = 7, and 7 teams advance.
- 2nd Round: Teams = 7, Matches = 3, and 4 teams advance.
- 3rd Round: Teams = 4, Matches = 2, and 2 teams advance.
- 4th Round: Teams = 2, Matches = 1, and 1 team is declared the winner.

Total number of matches = $7 + 3 + 2 + 1 = 13$.