USACO Setup Guide

Sebastian Jeon, Sameer Pai

September 12, 2018

"don't be bad" - Ancient Proverb

§1 What is USACO?

USACO stands for the USA Computing Olympiad. It aims to test students' algorithmic programming skills. Throughout the year, there are four contests (December, January, February, and the US Open). In each contest, you have 4-5 hours to solve 3 programming questions. There are four divisions: Bronze, Silver, Gold, and Platinum. If you do well on one division, you are permanently promoted to the next division (i.e. you can't get demoted, ever). More information is provided on the USACO Site (usaco.org).

§2 Getting Started

You'll need to make two accounts: one on train.usaco.org, and one on usaco.org. These accounts are not linked at all. The first link contains many training problems, and the second is where you'll be actually taking contests. More detailed resources are available at http://usaco.org/index.php?page=resources.

§2.1 Before You Start

First, learn a programming language. These handouts will be written in C++, and we strongly recommend learning this language. Java is usable for the most part, but it is **heavily** recommended that you avoid Python.

One good site to learn C++ is learncpp.com. You can skip all of the object-oriented stuff, and most of the pointer stuff. Read chapters 1-7 there, and then 16-18. You shouldn't try to do the USACO training pages before you are adequately familiar of your language of choice.

§2.2 Problem Format

Now you know a language (hopefully), and you're ready to solve problems. All USACO problems have the exact same input and output formats. Specifically, each problem has a specific task name (which is not the problem name). When you submit a program, it is run by the USACO grader (a program that judges your code to see if it works). Your program should take input from the file "taskname.in". Using this input, your program should do what the problem wants you to do (i.e. get the answer!). Then, it should output whatever answer the problem wants to the file "taskname.out". There are 10(ish) test cases for every problem, meaning that the grader gives your program 10 different inputs.

§2.3 The First Problem

If you have done everything correctly, you should have made it to the first problem in the training pages called "Your Ride Is Here". As this problem is intended to be an introduction to competitive programming, we present the solution code along with analysis on the next page. More experienced programmers are encouraged to solve this by themselves before reading the solution.

```
/*
NAME: *insert your username*
TASK: ride
LANG: C++11
*/
// header

#include <bits/stdc++.h> // basically all of the packages
using namespace std;

int score(string s)
{
    int prod = 1;
    for(char arg : s) {
        prod *= (arg - 'A' + 1);
    }
    return prod % 47;
}
int main()
{
    ifstream fin("ride.in");
    ofstream fout("ride.out"); // open input files

    string comet, group;
    fin >> comet >> group;
    if(score(comet) == score(group))
        fout << "GO\n"; // terminate output with a new line
    else
        fout << "STAY\n";
}
```

This code has three main parts: getting the input, getting the answer, and printing the answer. Hopefully you know how file input works, so we won't go over that. The score is calculated using the function `score()`, by splitting up the string into its individual characters and multiplying each of them together. Note that in ASCII (the encoding that C++ uses for characters), subtracting a letter from the value 'A' gives the value of that letter (i.e. 'A' - 'A' = 0, etc.). On `train.usaco.org`, you have to have a header (i.e. comments at the top of your code) that has your username (mine is sameerp2), the task name, and the language. You should be able to copy-paste this code into a file on your computer (change the name at the top!), and submit it. Congratulations! You solved a problem!

§3 What Now?

Now that you know the technical details about how to submit a problem, you can start learning actual algorithms.