Algorithms

CodeForces OJ

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Teaching, Training and Coaching for more than a decade!

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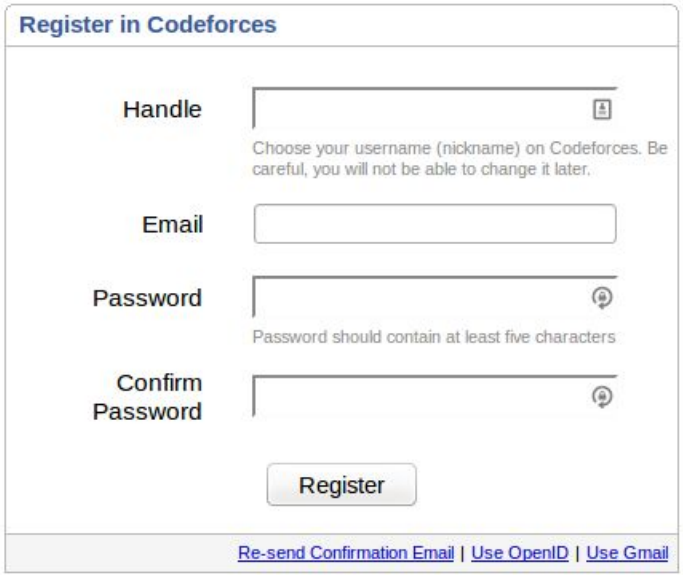
Codeforces Online judge

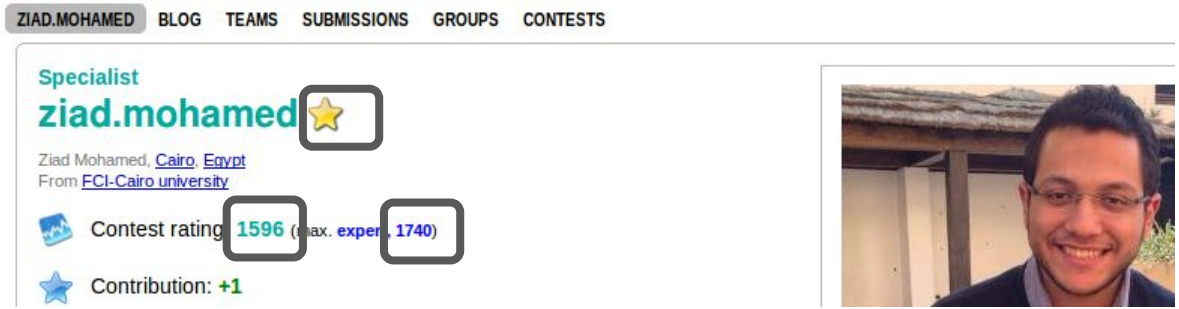
- It runs online contests (~2 hours duration).
  - Each contest has 2 divisions
  - Division 1 is for seniors (rating 1900+), Division 2 is for juniors, and there are more
  - Every contestant has a rating (score)
  - Each Division has ~5 sorted problems (easy to hard)
  - Once a contest starts, all problems can be viewed
  - Contestants are split into rooms (~40 per room)
  - You can ask about clarifications during the contest
  - You can later run these contests as Virtual Contests
  - Most important: Style close to ACM ICPC
- English code problems/tutorials of old problems are not so good

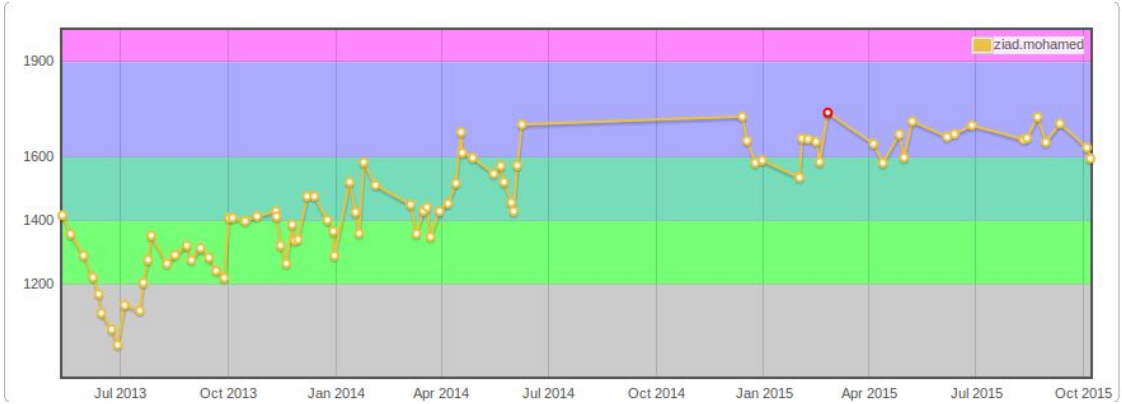
Codeforces - Registration

OpenID or Gmail account.

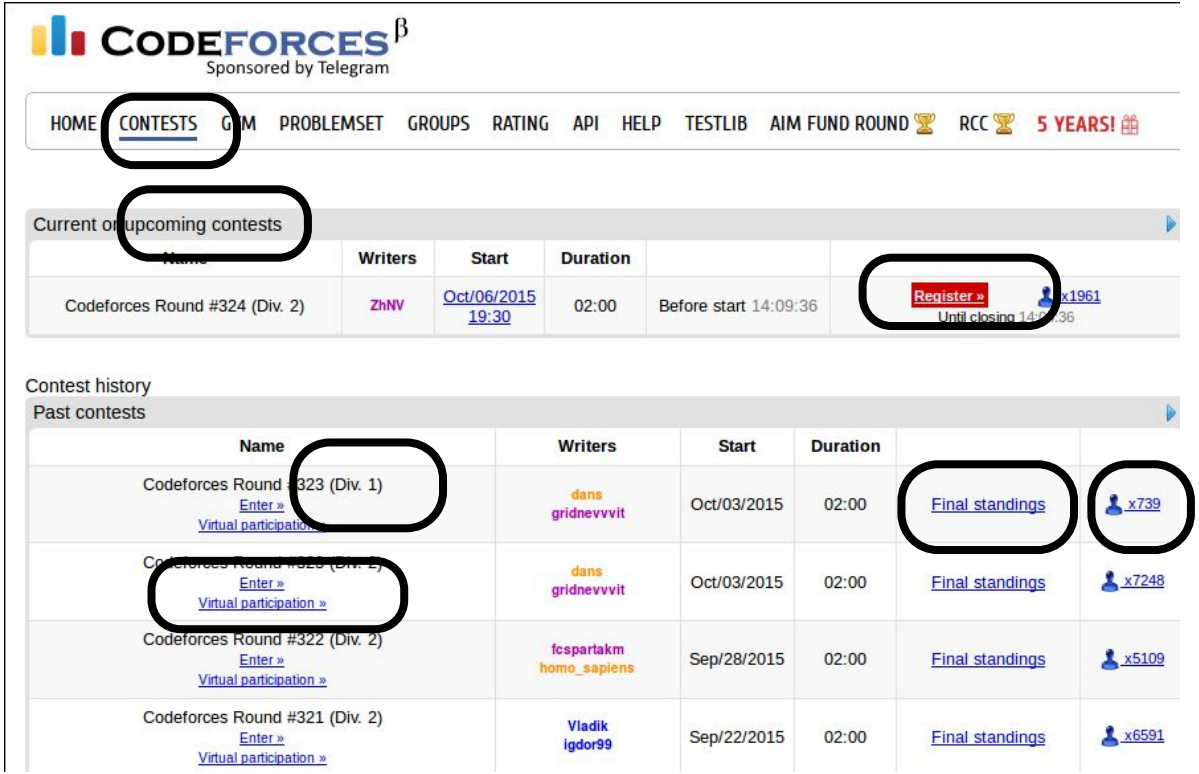


Your Profile

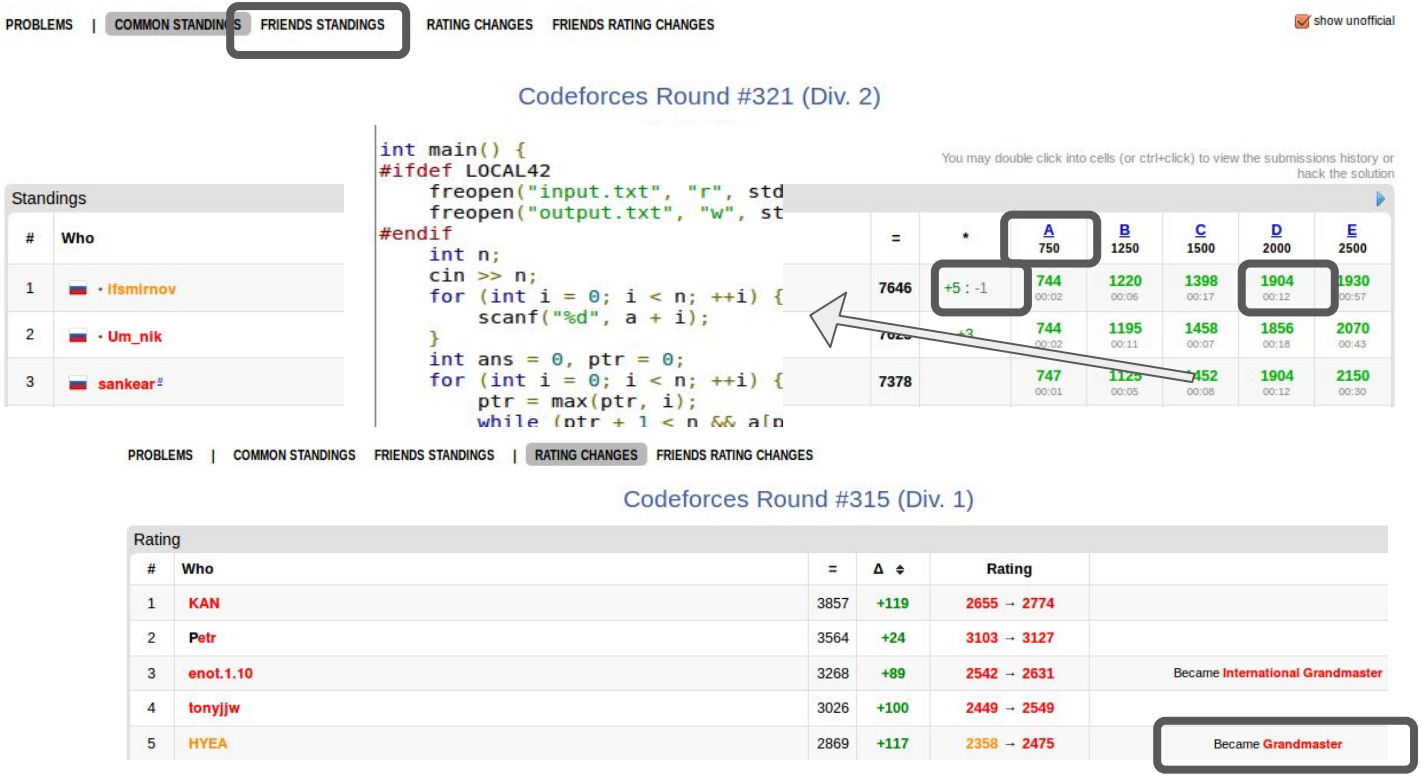




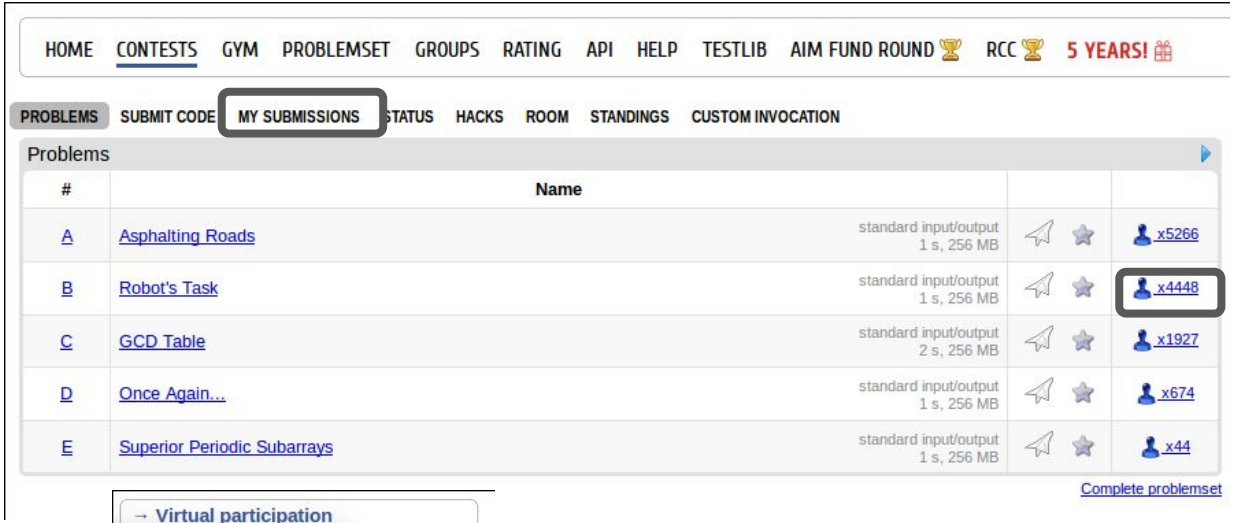
Contests Tab

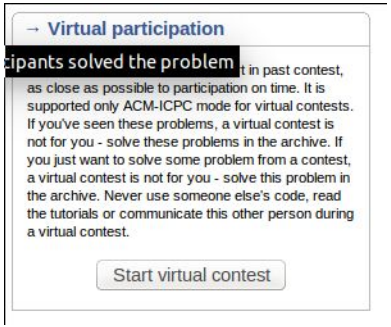


Contest: Standings



Contest - Problemset





Contest - Problemset - Status

Contest status

#	When	Who	Problem	Lang	Verdict
13486383	2015-10-08 04:55:30	mehtaharsh199	583B - Robot's Task	Java 8	In queue
13486382	2015-10-08 04:55:26	derekchen	584D - Dima and Lisa	GNU C++11	Running on test 1
13486381	2015-10-08 04:54:58	eduardoibanez	4A - Watermelon	Java 8	Wrong answer on test 5
13486380	2015-10-08 04:54:56	Jleung	468A - 24 Game	Java 8	Wrong answer on test 2
13486379	2015-10-08 04:54:31	misakamicodo	1A - Theatre Square	GNU C++	Accepted

By mostafa.saad.fci, contest: Codeforces Beta Round #1, pr

```cpp
#include <iostream>
#include <cmath>
using namespace std;

int main()
{
    long double n, m, a;
    cin >> n >> m >> a;
    long long rs = ceil(n/a)*ceil(m/a);

    cout << rs << endl;

    return 0;
}
```

Test: #1, time: 0 ms., memory: 4 KB, exit code: 0,
Input
6 6 4
Output
4
Answer
4
Checker Log
ok 1 number(s): "4"

Test: #2, time: 0 ms., memory: 0 KB, exit code: 0,
Input
1 1 1
Output
1
Answer
1
Checker Log
ok 1 number(s): "1"

Test: #3, time: 0 ms., memory: 0 KB, exit code: 0,
Input
2 1 1

Codeforces - Your Solution

- During contests, the solution is judged over a small number of tests called **pretests** (not visible)
  - After he contest, the solution is judged over a **full test set**
  - In **practice**, if the code failed, you can see the test cases
- You can re-submit solutions [Unless locked]
  - However, resubmission => score penalty
  - If it fails on the 1st test case (sample case), NOT considered
  - Penalties only on solved problems.
- You can see other people's submissions
  - After the contest, at any time
  - During the contest, if you locked the problem for **hacking** purposes

Contest - Problem

PROBLEMS | SUBMIT CODE | MY SUBMISSIONS | STATUS | HACKS | ROOM | STANDINGS | CUSTOM INVOCATION

A. Asphalting Roads

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

City X consists of n vertical and n horizontal infinite roads, forming $n \times n$ intersections. Roads (both vertical and horizontal) are numbered from 1 to n, and the intersections are indicated by the numbers of the roads that form them.

Sand roads have long been recognized out of date, so the decision was made to asphalt them. To do this, a team of workers was hired and a schedule of work was made, according to which the intersections should be asphalted.

Road repairs are planned for n^2 days. On the i-th day of the team arrives at the i-th intersection in the list and if **none** of the two roads that form the intersection were already asphalted they asphalt both roads. Otherwise, the team leaves the intersection, without doing anything with the roads.

According to the schedule of road works tell in which days at least one road will be asphalted.

Input

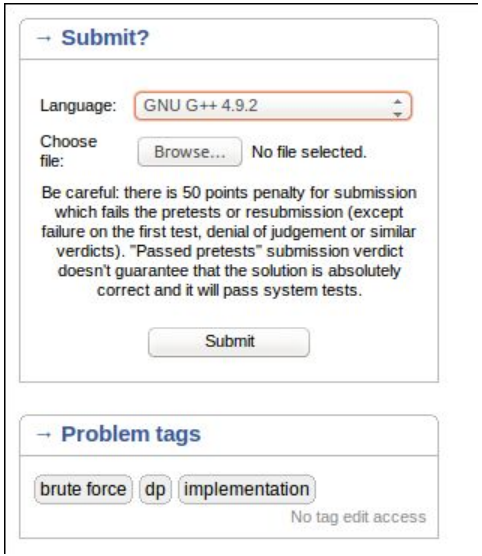
The first line contains integer n ($1 \le n \le 50$) — the number of vertical and horizontal roads in the city.

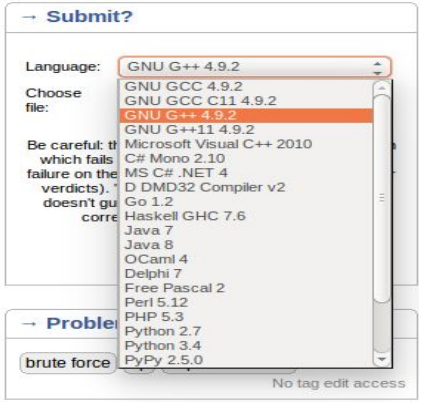
Next n^2 lines contain the order of intersections in the schedule. The i-th of them contains two numbers h_i, v_i ($1 \le h_i, v_i \le n$), separated by a space, and meaning that the intersection that goes i-th in the timetable is at the intersection of the h_i-th horizontal and v_i-th vertical roads. It is guaranteed that all the intersections in the timetable are distinct.

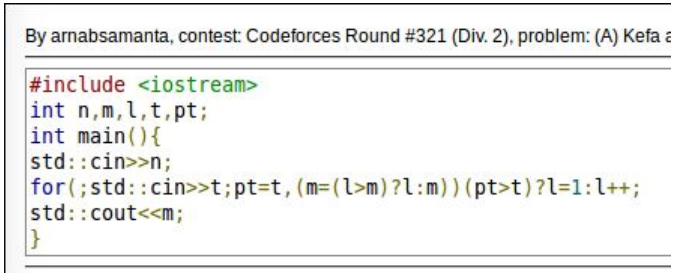
Output

In the single line print the numbers of the days when road works will be in progress in ascending order. The days are numbered starting from 1.

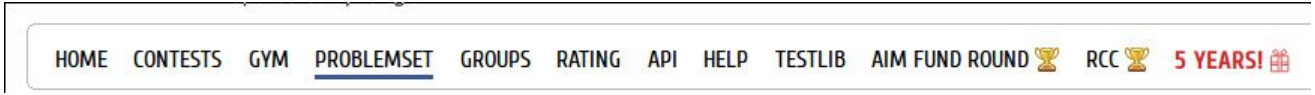
Contest - Problem - Right Panel

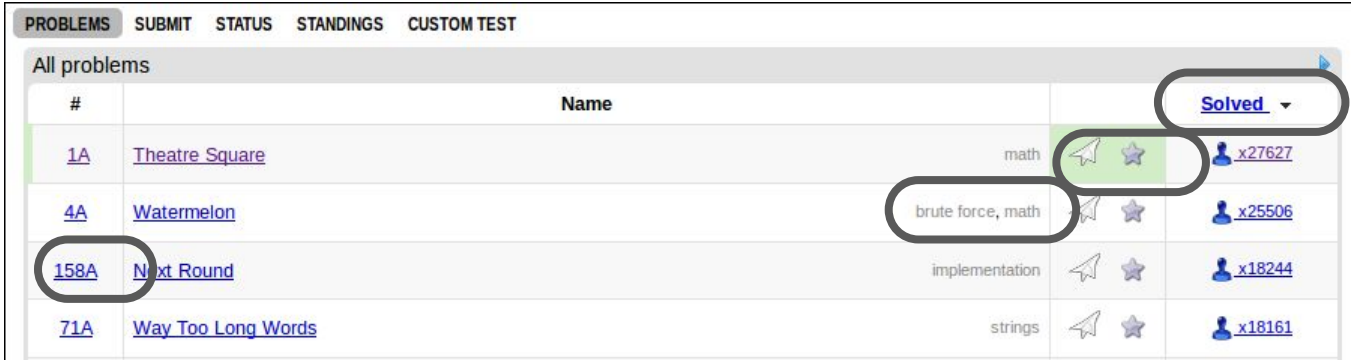


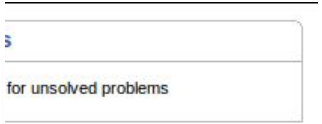




All Problem Set Tab







Hacking Other People's Solutions

- **Purpose**: Gaining more points by finding other people's wrong submissions
- **Lock** a presolved problem (can’t resubmit)
- In your room, view other code..find wrong one
- **Hack** it: Give a test case to show its failure
  - If the code fails => get 100 points. Otherwise, lose 50 points
  - If the code is already hacked, or the owner resubmitted (e.g. hacking old code) => nothing happens
- My hacked solution: 0 pts, resubmit (unless locked), and a test case is added to your pretest.

Practice - Failed Solution?

By mostafa.saad.fci, contest: Codeforces Beta Round #1, problem: (A) Theatre Square, Wrong answer on test 1, #

```cpp
#include <iostream>
#include <cmath>
using namespace std;

int main()
{
    long long n, m, a;
    cin >> n >> m >> a;
    long long rs = ceil(n/a)*ceil(m/a);

    cout << rs << endl;

    return 0;
}
```

→Judgement Protocol

Test: #1, time: 30 ms., memory: 0 KB, exit code: 0, checker exit code: 1, verdict: WRONG_ANSWER

Input

```
6 6 4
```

Output

```
1
```

Answer

```
4
```

Checker Log

```
wrong answer 1st numbers differ - expected: '4', found: '1'
```

Practice - Tutorial

Codeforces Round #318 [RussianCodeCup Than

By **Errichto**, 6 weeks ago,

> Div2B — Bear and Three Musketeers
>
> Warriors are vertices and "knowing each other" is an edge. We want to find cor
> (and print $sum - 6$ because we don't want to count edges from one chosen ver
>
> Brute force is $O(n^3)$. We iterate over all triples a, b, c and consider them as m
> know each other). If they are, then we consider sum of their degrees.
>
> We must notice that there is low limit for number of edges. So instead of iteratir
> then iterate over third vertex. It gives us $O(n^2 + nm)$ and it's intended solution
> should additionally store edges in 2D adjacency matrix.
>
> It's also possible to write it by adding "if" in right place in brute forces to get $O($
>
> Div1A — Bear and Poker
>
> Any positive integer number can be factorized and written as $2^a \cdot 3^b \cdot 5^c \cdot 7^d \cdot \ldots$

Colors and Titles

Rating Bounds	Color	Title	Division
2900+	Red	Legendary Grandmaster	1
2600 — 2899	Red	International Grandmaster	1
2400 — 2599	Red	Grandmaster	1
2300 — 2399	Orange	International Master	1
2200 — 2299	Orange	Master	1
1900 — 2199	Violet	Candidate Master	1
1600 — 1899	Blue	Expert	2
1400 — 1599	Cyan	Specialist	2
1200 — 1399	Green	Pupil	2
0 — 1199	Gray	Newbie	2

What else to know?

- Gained Points for a correct submission?
  - X point Problem after M minutes = X - M(X/250) Points
    - a 500 points problem after 10 minutes: 500 - 10 * 2 = 480 points
  - If you submitted N times, penalty (N-1)*50
  - If submitted 3 times after 10 minutes for a 500 problem
    - 480 - (3-1) * 50 = 380
    - Minimum score is 30% of X = 150
- Contest points = ∑ problem points + Hacks
- Gym contests: External contests by others
- Can-dos and can't-dos in the contest? in contest?
- How does the Rating System works?

"Acquire knowledge and impart it to the people."

"Seek knowledge from the Cradle to the Grave."