

CS 101: Computer Programming and Utilization

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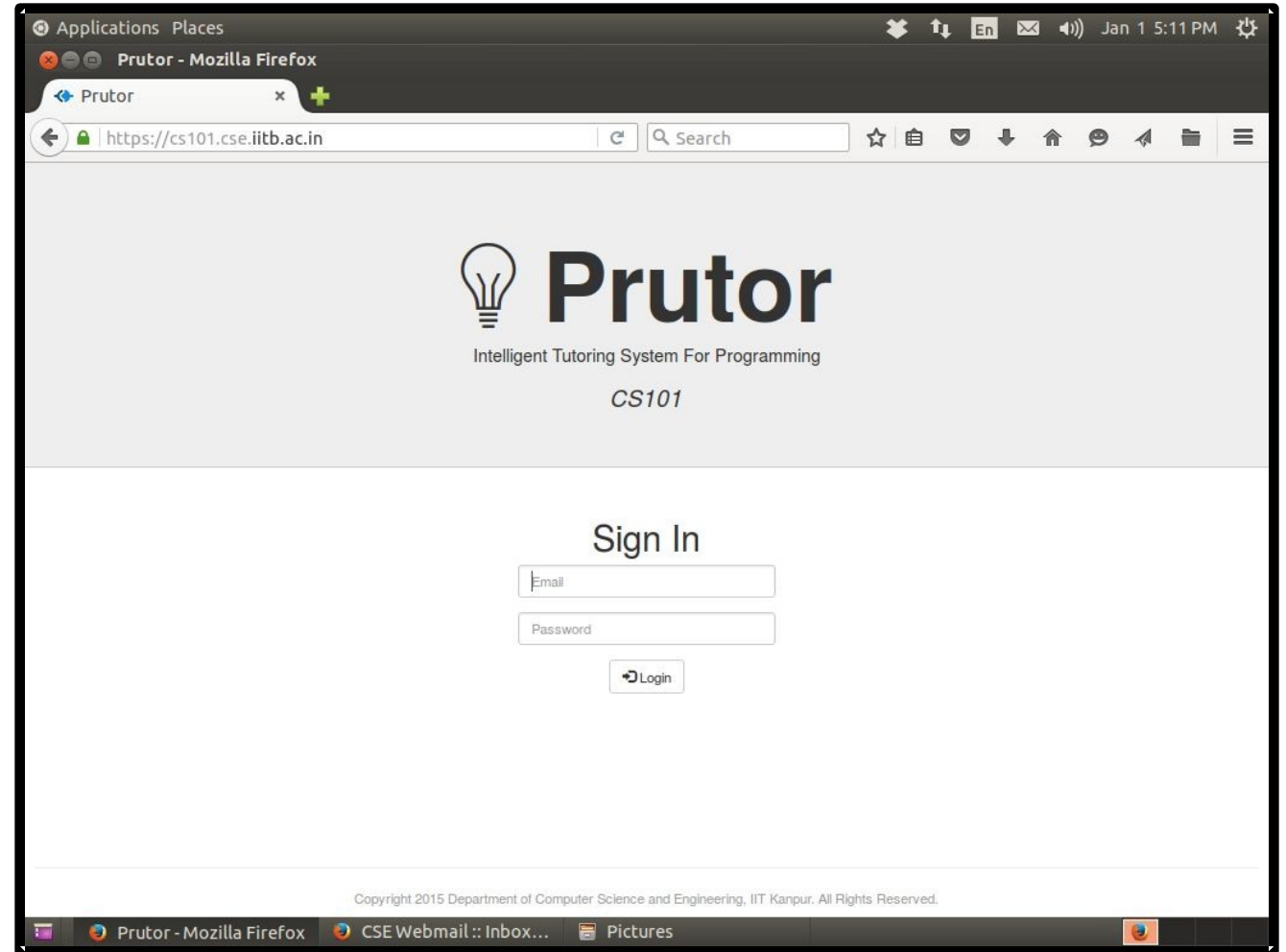
Lecture 1: **Introduction to Prutor**
(Online system for program preparation and submission)

About These Slides

- These slides describe **Prutor** which is a part of an *Intelligent Tutoring System (ITS)* developed by Amey Karkare at IIT Kanpur
- At IIT Bombay, it is available for cs101 at <https://cs101.cse.iitb.ac.in>
- Slides prepared by Nisha Biju and Anshuman Dhuliya

Login Page

- Login at
<https://cs101.cse.iitb.ac.in>
- Accesible through the course page also
<http://www.cse.iitb.ac.in/~cs101/>
- Enter your IITB Idap id and password to login
- If Prutor recognizes you as a registered student of cs101, it will authenticate your credentials



Your Homepage

Your homepage shows you the

- **Events** Arena: Questions (i.e. problems for which you need to write programs)
(may be ungraded questions)
- **Course Statistics** Arena: The status of your submissions
- **Grade Card** Arena
- **CodeBook** Arena: Your submitted programs
- **Practice** Arena
- **Scratchpad** Arena

The screenshot displays the Prutor CS101 homepage. The browser window shows the URL <https://cs101.cse.iitb.ac.in/home>. The page features several key sections:

- Ongoing Event:** A section titled "test1" with a deadline of "Ends on Fri Jan 01 2016 at 21:53:00". It contains a table of questions:

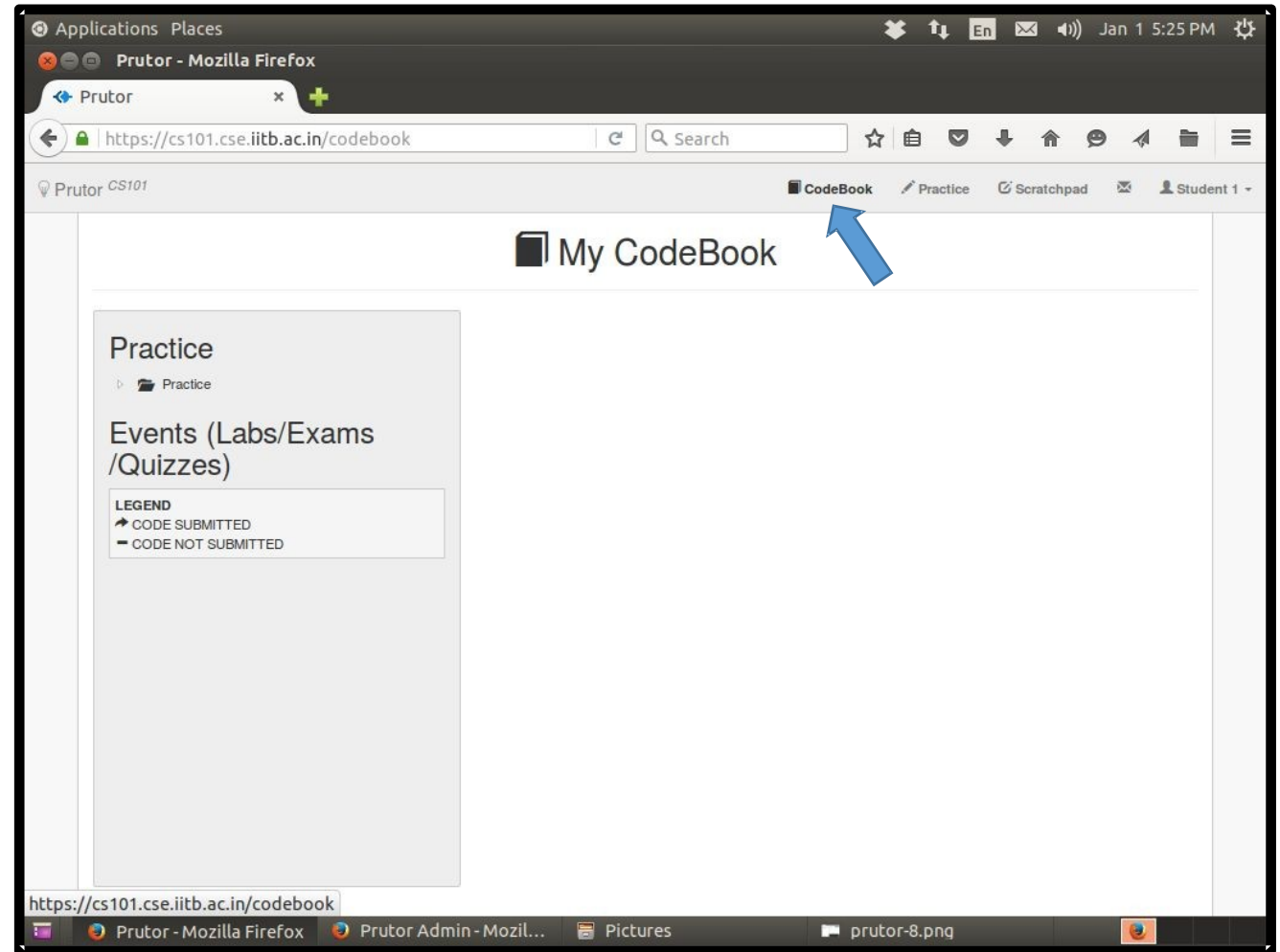
| Q# | Points | Status | Action |
|----|-----------|---------------|------------------------------|
| Q1 | 20 Points | submitted | Start Coding |
| Q1 | 20 Points | not-submitted | Start Coding |
| Q2 | 20 Points | submitted | Start Coding |
| Q3 | 20 Points | not-submitted | Start Coding |
| Q4 | 20 Points | not-submitted | Start Coding |

- Course Statistics:** A bar chart showing "Submitted" (2) and "Not Submitted" (3) counts.
- Course Events:** A list showing "Labs" (1), "Exams" (0), and "Quizzes" (0).
- Grade Card:** A button labeled "GRADE CARD" with a checkmark icon.

The browser's taskbar at the bottom shows the Prutor - Mozilla Firefox window, a CSE Webmail inbox, and a Pictures folder.

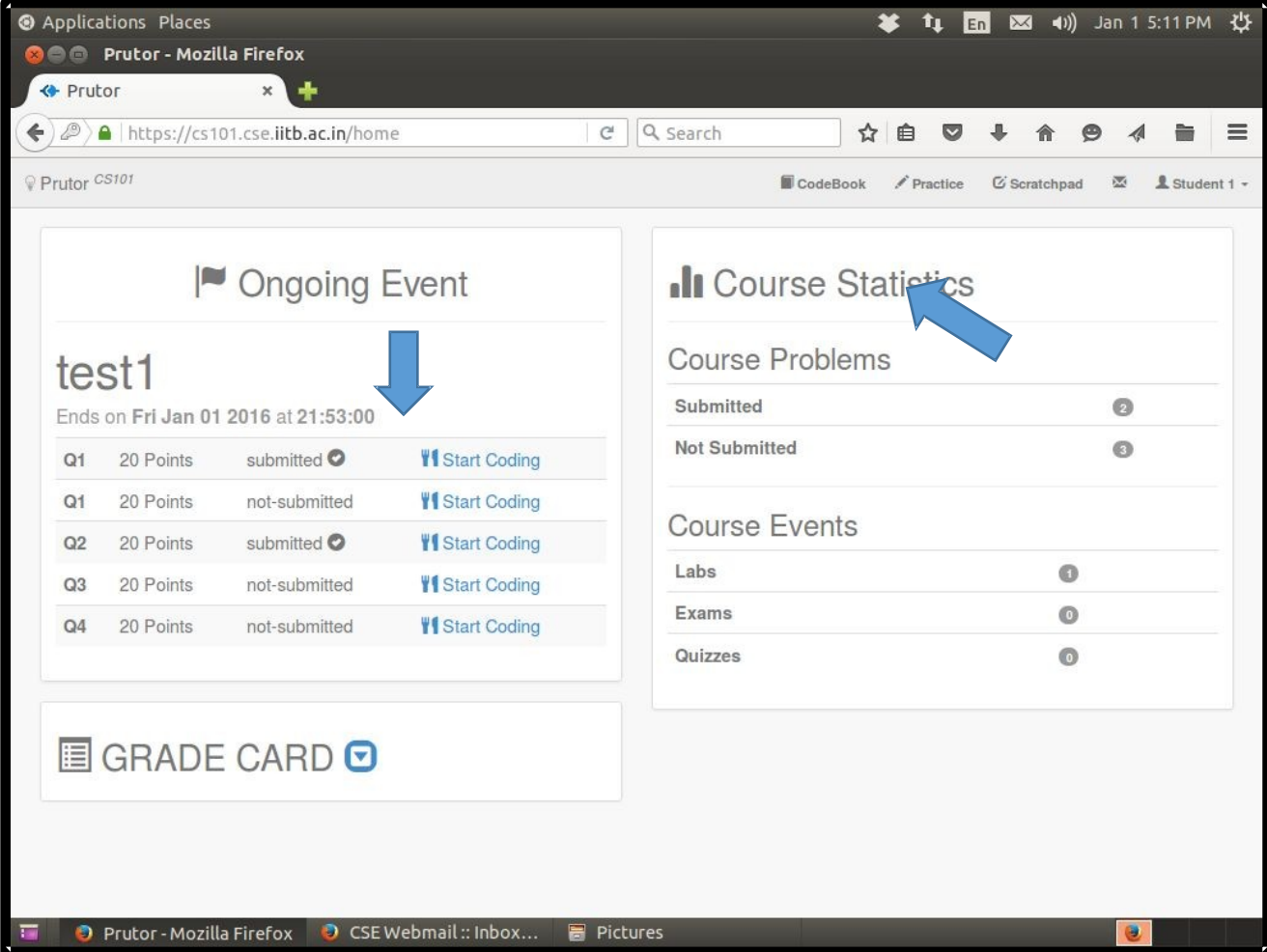
CodeBook Arena

- Here you can see all the problems submitted by you.
- In the picture on the right, the CodeBook is blank as the student has not submitted any question.



Events Arena

- An **Event** is visible only when it is **Ongoing**
- In the picture on the right, the ongoing event is **test1**, which has five questions with 20 marks each
- Click on the **Start Coding** link to start solving the questions
- The events in graded labs will contribute to your grades, and the events in regular labs will be for practice only
(We will have six graded labs)



The screenshot shows the Prutor CS101 interface in a Mozilla Firefox browser. The main content area is titled "Ongoing Event" and features a large blue arrow pointing to the event "test1". Below the event title, it states "Ends on Fri Jan 01 2016 at 21:53:00". A table lists five questions (Q1 to Q5) with their status and a "Start Coding" link for each. The status for Q1 and Q2 is "submitted", while Q3, Q4, and Q5 are "not-submitted".

| Question | Points | Status | Action |
|----------|-----------|---------------|------------------------------|
| Q1 | 20 Points | submitted | Start Coding |
| Q1 | 20 Points | not-submitted | Start Coding |
| Q2 | 20 Points | submitted | Start Coding |
| Q3 | 20 Points | not-submitted | Start Coding |
| Q4 | 20 Points | not-submitted | Start Coding |

Below the event details is a "GRADE CARD" button. To the right, the "Course Statistics" section shows a bar chart and a table with the following data:

| Category | Count |
|---------------|-------|
| Submitted | 2 |
| Not Submitted | 3 |
| Labs | 1 |
| Exams | 0 |
| Quizzes | 0 |

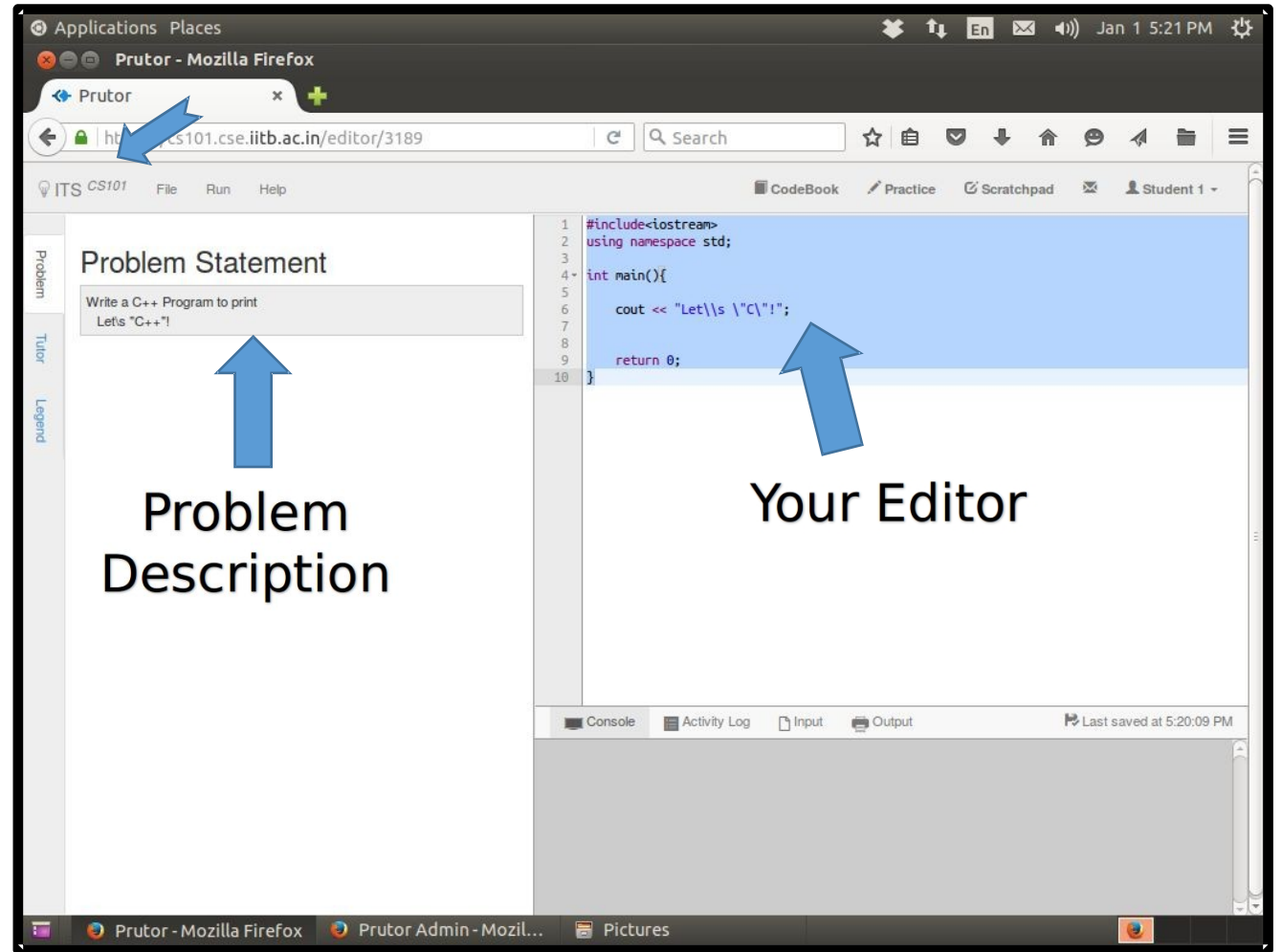
Plain C++ and Simplecpp

- The events arena shows the list of problems
- Some of these are **plain C++** problems and some are **simplecpp** problems
- All the problems are **edited**, **compiled**, and **executed** in the **same manner**
- The **output** for **plain C++** programs appears **directly**
- Viewing the **output** of **simplecpp** needs an **additional step**
(Explained in a later slide)

Code Editor

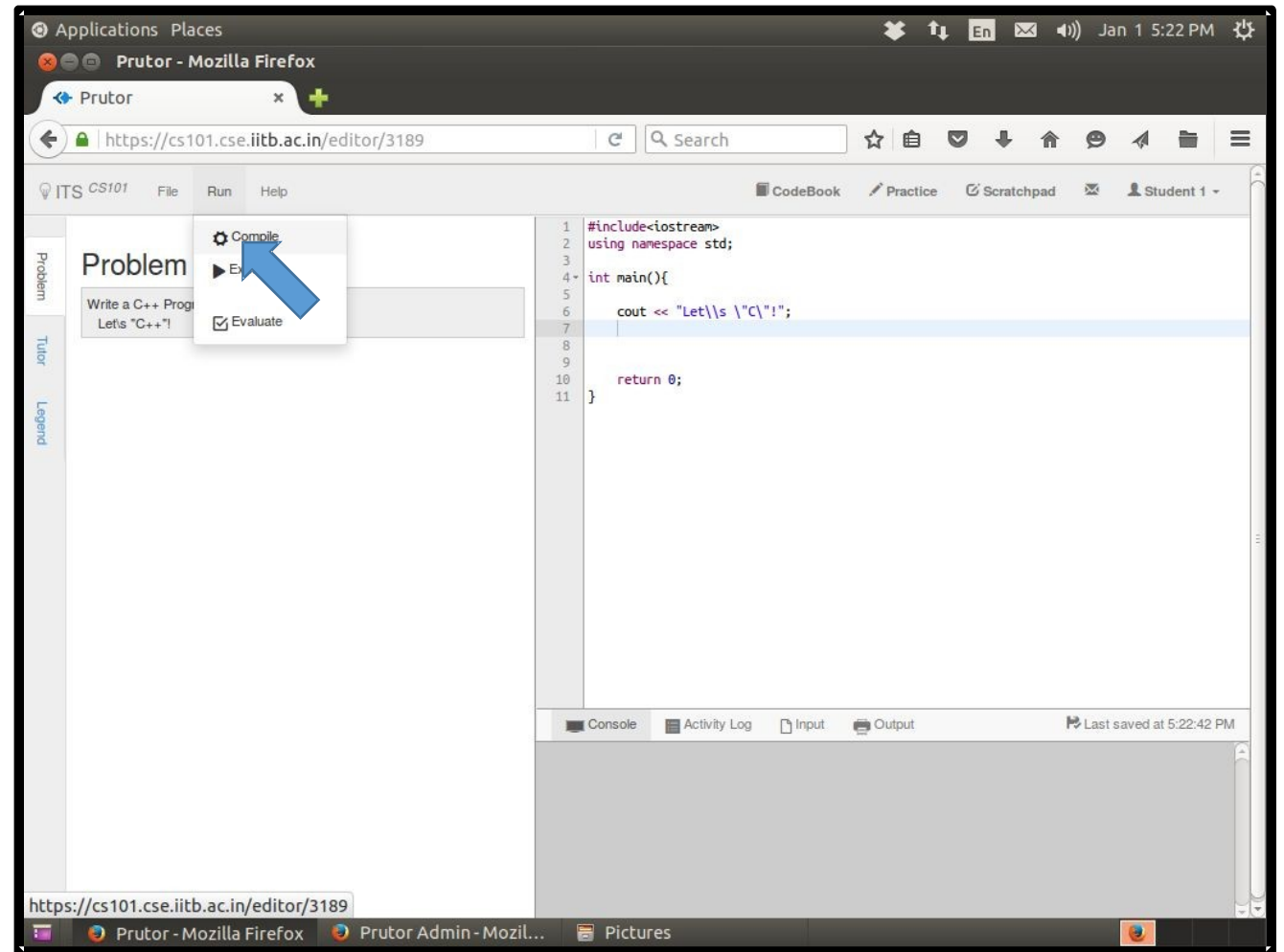
- You reach here by clicking the **Start Coding** link of a question
- The **Code Editor** saves your code every 5 seconds
- You can also save your code by pressing **Ctrl-s**
- Or you can save using the **Save** option of the **File** tab

We can play back your key strokes and retrace your steps to figure out whether you wrote the code yourself or copied it



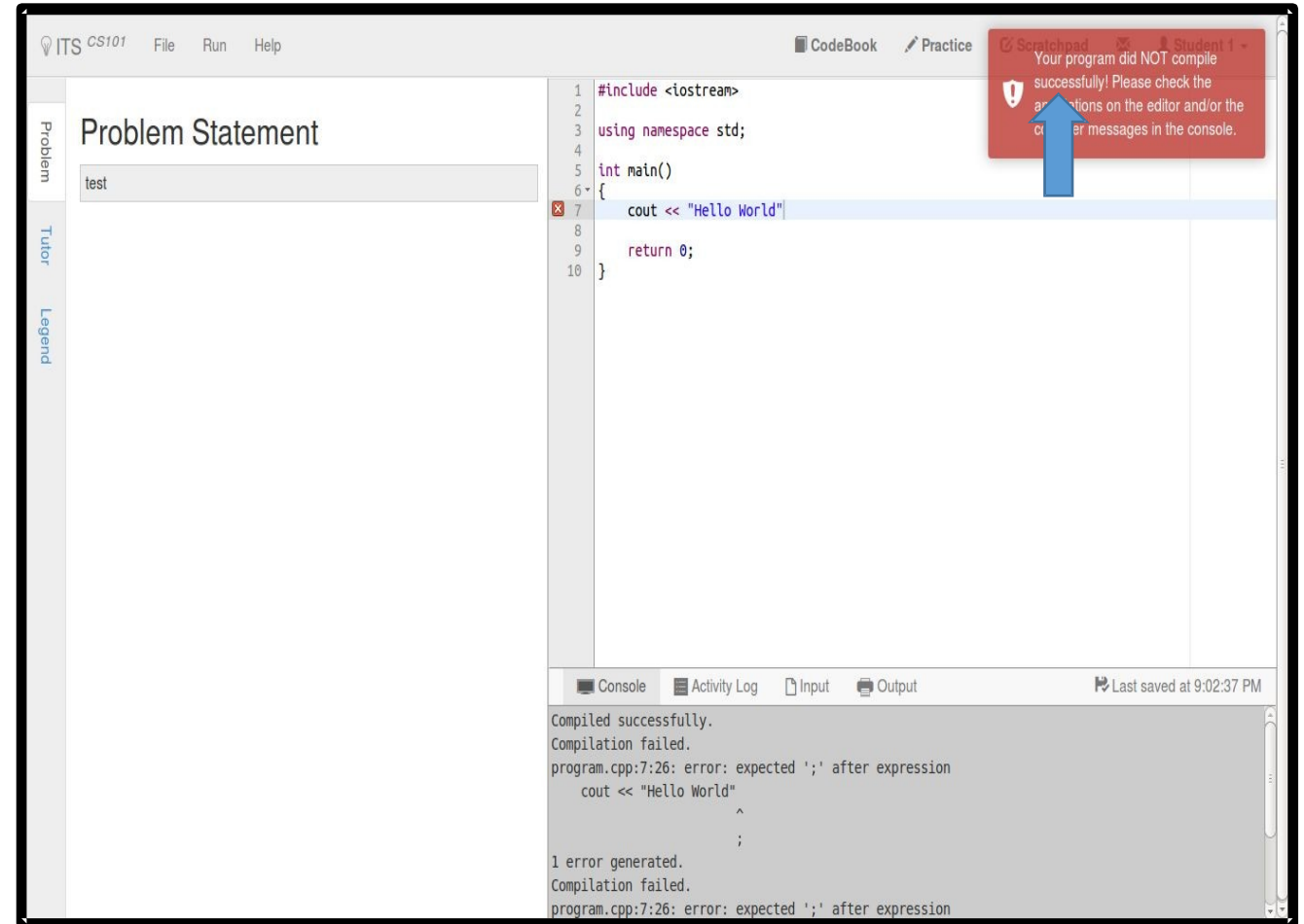
Compiling Code

- After writing the code, choose the **Compile** option in the **Run** tab



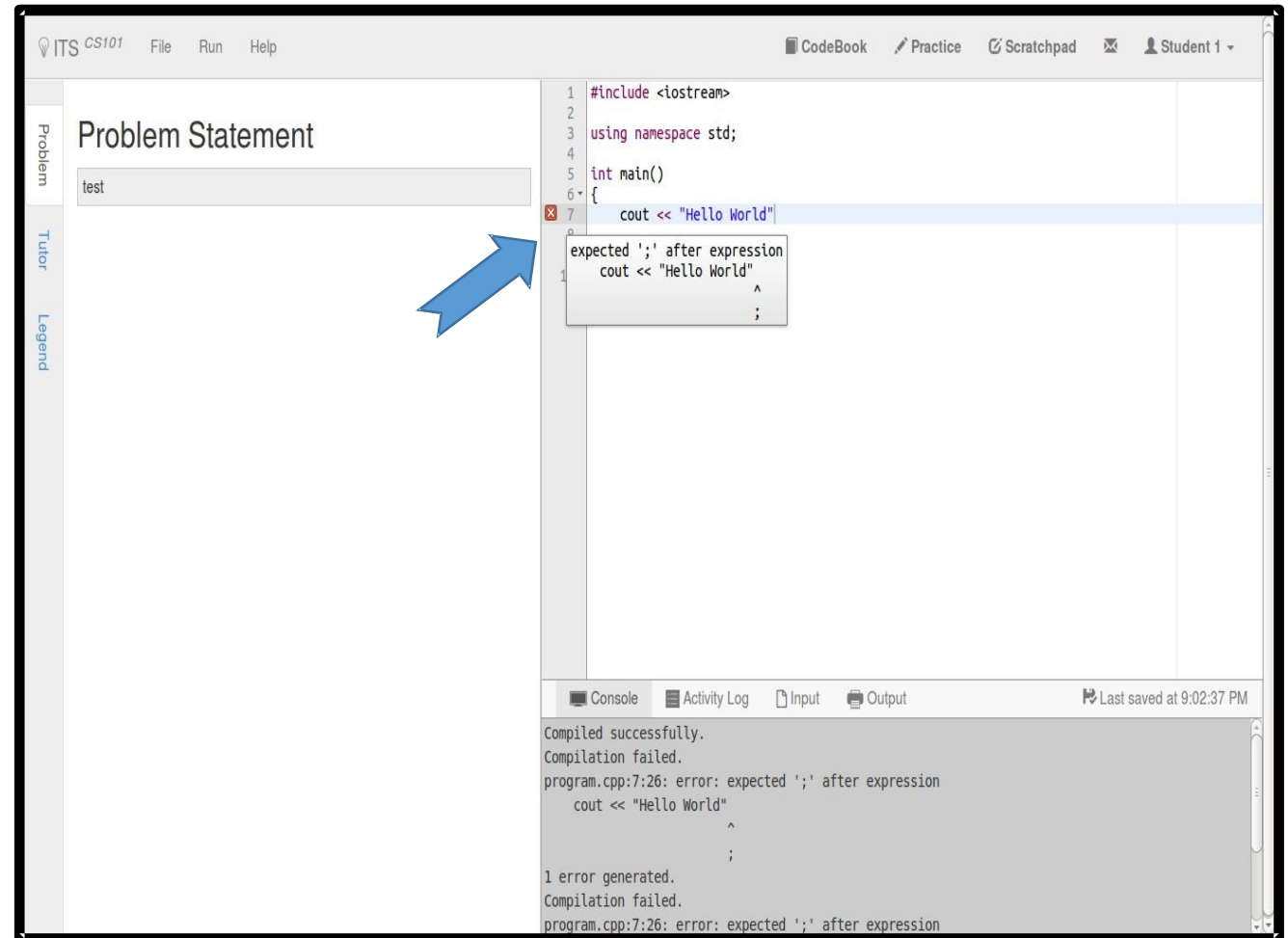
Compiler Messages

- You can view the compilation results below the **Code Editor** in the gray area, which is your virtual console
- Also a **floating notification** is shown on top-right corner for few seconds
- In the picture on the right, the compilation has failed as can be easily inferred from the message in **red blob of the floating notification**



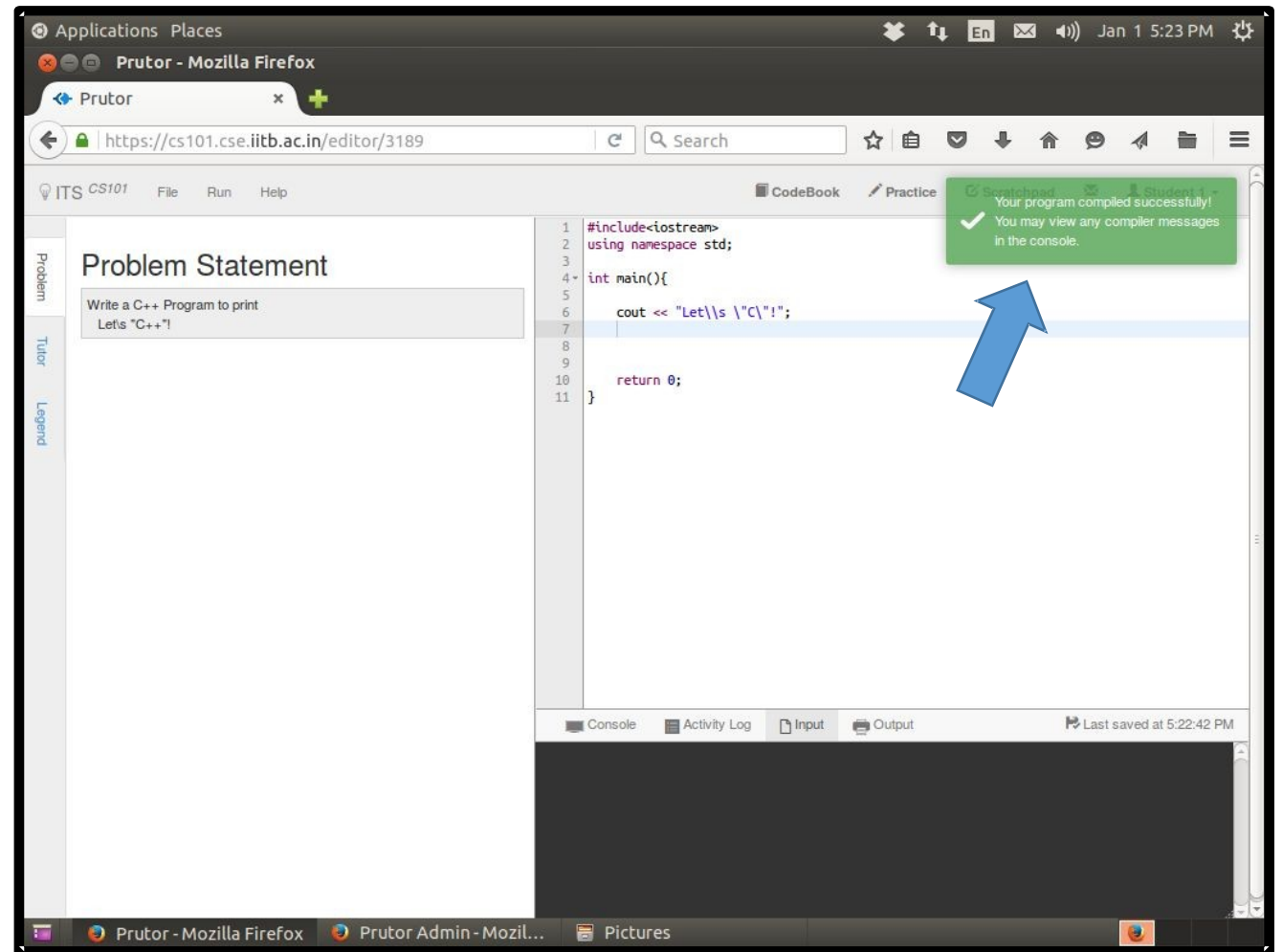
Error Messages

- The compiler also issues messages about errors in specific lines
- We can see the error in the box if we take the mouse pointer towards the left side of the editor
- Read the compiler message at the bottom carefully and correct your error



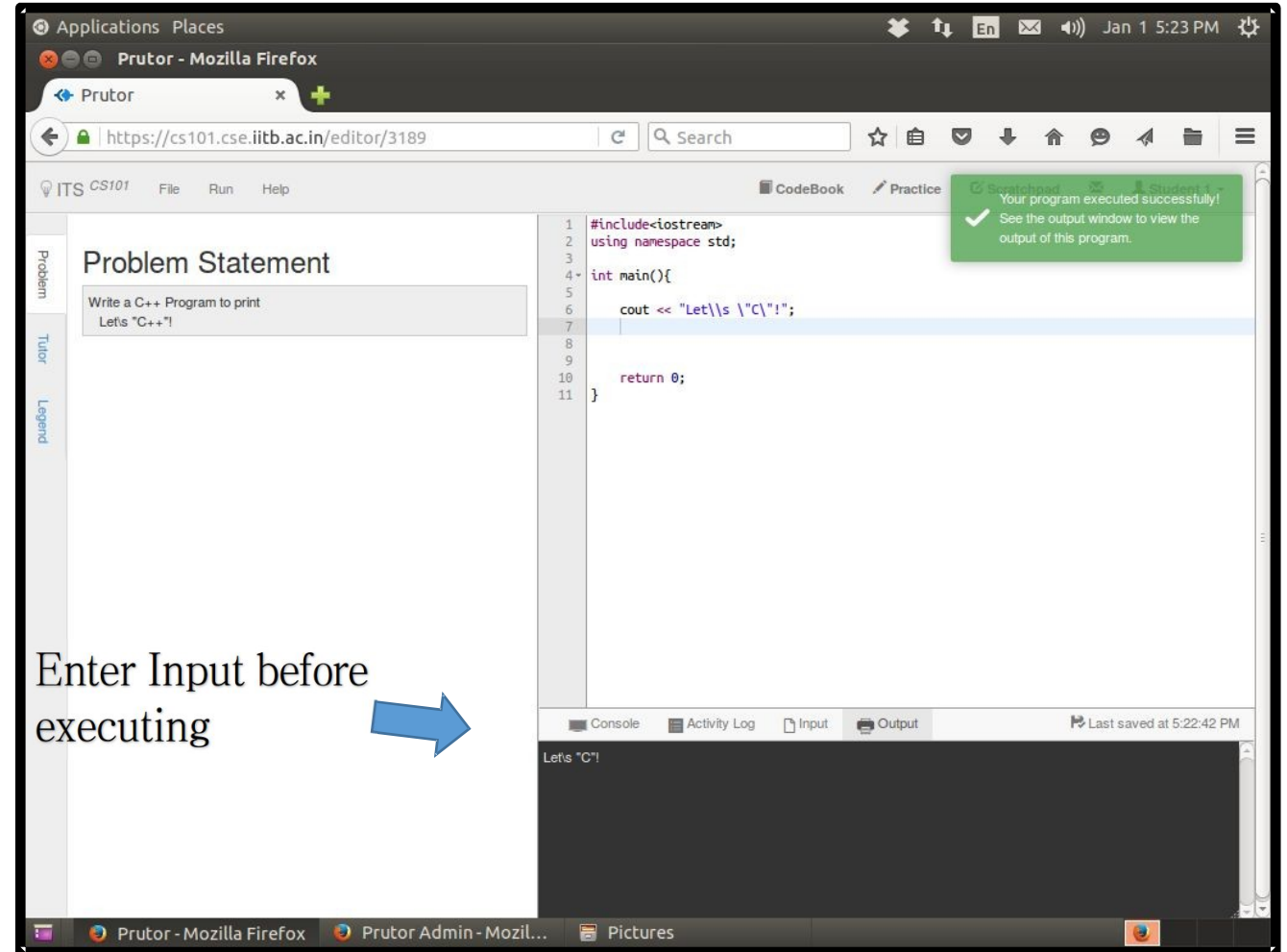
Successful Compilation

- The floating notification on top-right corner will notify you when your compilation is successful
- The color of the floating notification would be green



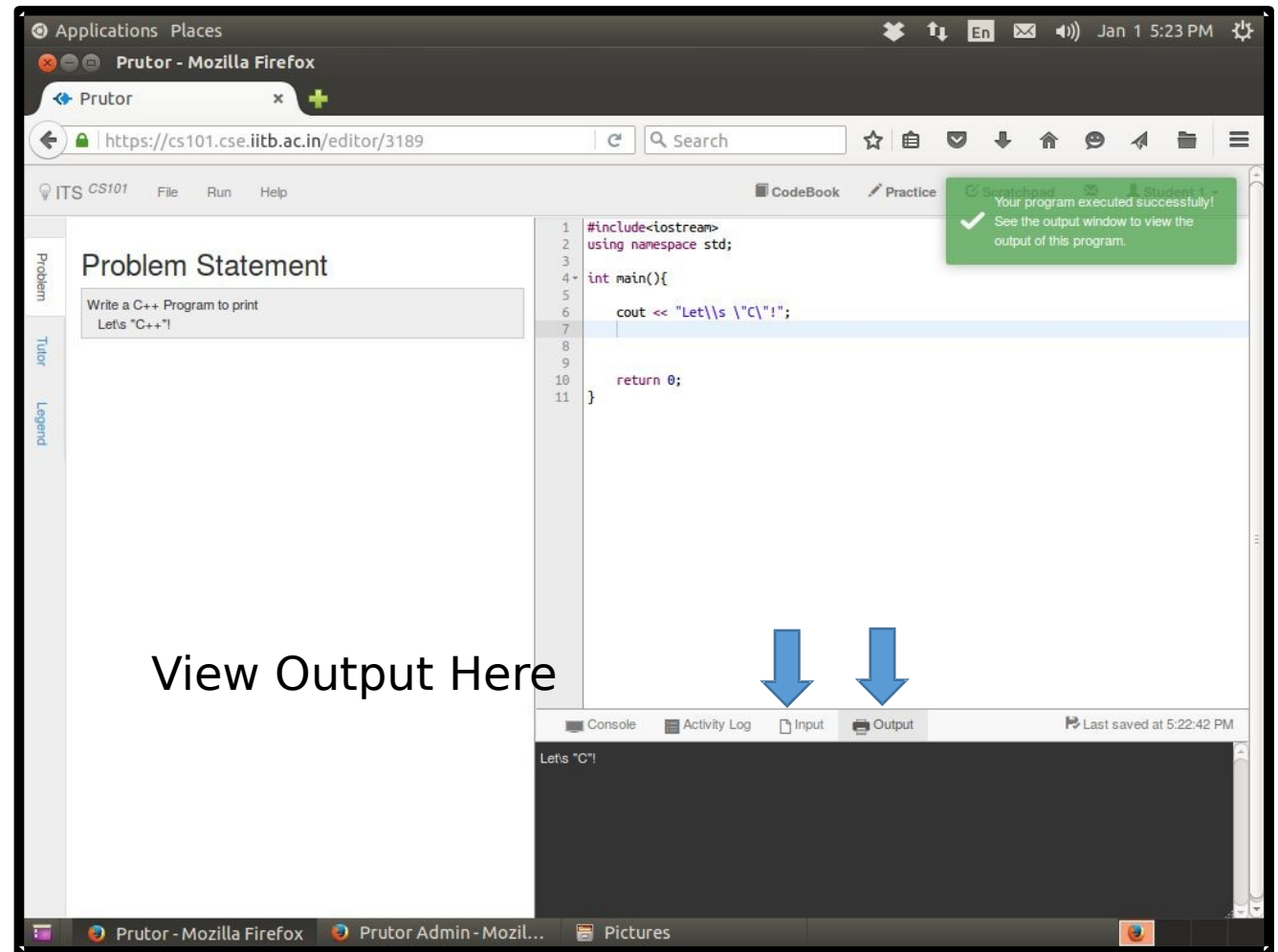
Executing Your Program

- If your program requires input data, then you need to provide it before executing the program.
- For providing the input, click on the **Input** tab below the **Code Editor** and enter the input as you expect it to be
- Click on **Execute** option in the **Run** tab to execute the program
- Note: Before executing make sure that your program has compiled successfully



Viewing the Output

- After successful execution, a **green floating notification** will appear on the **top-right corner** and the output will be shown at the **bottom**



Evaluating Your Program

- **Evaluation** refers to running the program on the given test cases
- You can see some test case but there may be some hidden test cases
- Click on the **Evaluate** option in the **Run** tab
- We may evaluate your program on additional test cases created after submission
- Evaluation Results are displayed on the left column heading **Tutor**
- Note: You can submit your code even if it does not pass all the test cases.

The screenshot shows the Prutor online IDE interface. The browser address bar displays `https://cs101.cse.iitb.ac.in/editor/3189`. The IDE has a menu bar with 'ITS CS101', 'File', 'Run', and 'Help'. On the right, there is a code editor with the following C++ code:

```
1 #include<iostream>
2 using namespace std;
3
4 int main(){
5
6     cout << "Let\s \"C!\"";
7
8
9
10    return 0;
11 }
```

A green notification box in the top right corner says: "Congratulations! Your program has passed all test cases. You can now submit this program." On the left side, under the 'Tutor' heading, there is an 'Evaluation Results' table:

| # | INPUT | EXPECTED OUTPUT | ACTUAL OUTPUT | |
|---|-------|-----------------|---------------|---|
| 1 | | Let\s "C!" | Let\s "C!" | ✓ |

Below the table, a blue box states: "Your program passed 1 out of 1 hidden test case(s). NOTE: These may not be the only hidden test cases that your program be evaluated upon." At the bottom, the console shows the output: "Compiled successfully. Execution succeeded. Program accepted." The system tray at the bottom indicates the last save time as 5:22:42 PM.

Repeated Evaluation

- You can evaluate your program as many times as you like before submission
- This allows you to keep correcting your program
- If your program passes all test cases, a **green floating notification** on the top-right corner will appear with an appropriate message

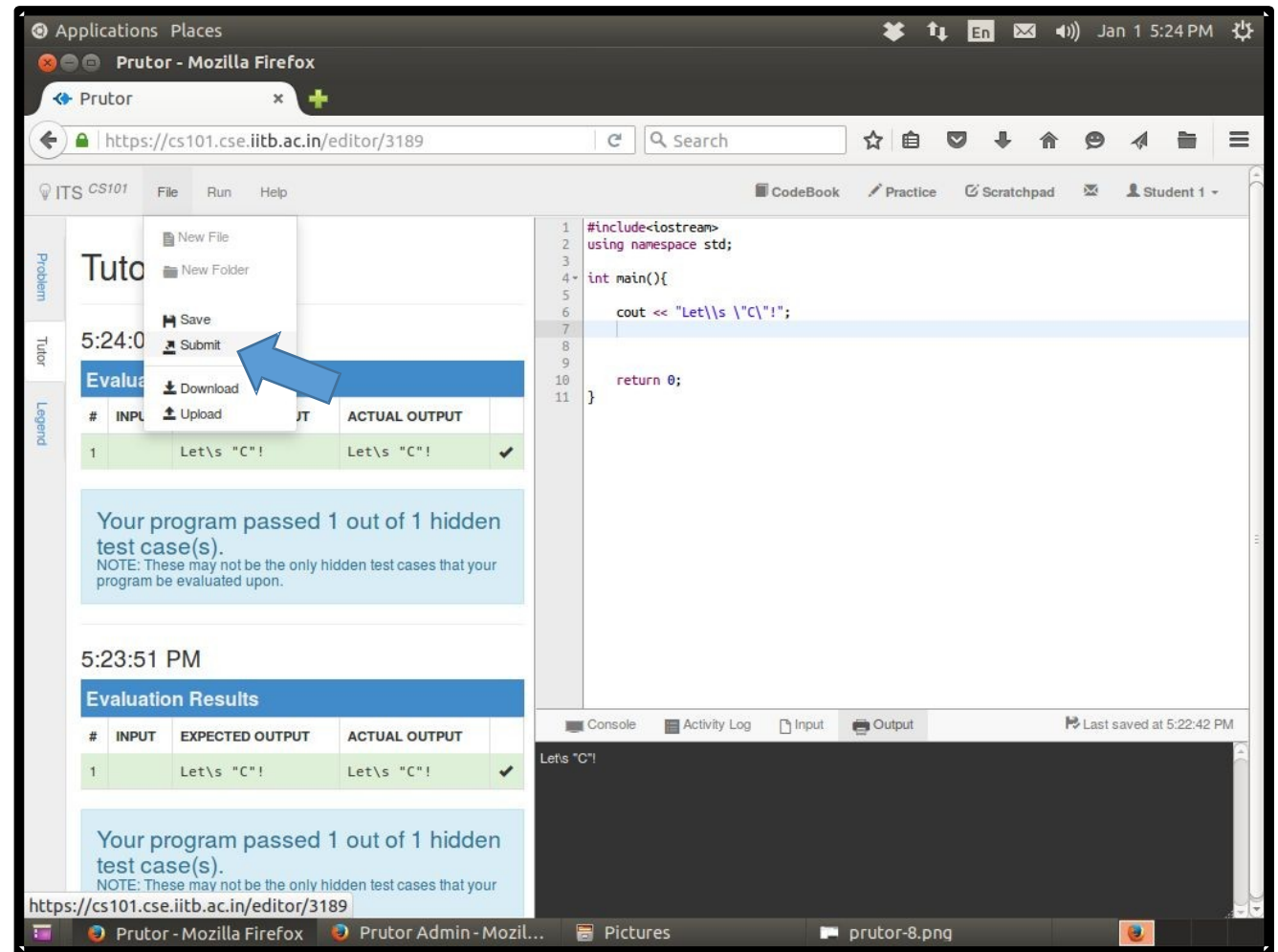
The screenshot displays the Prutor online IDE interface. The browser address bar shows the URL `https://cs101.cse.iitb.ac.in/editor/3189`. The IDE window has a menu bar with 'ITS CS101', 'File', 'Run', and 'Help'. On the left, there are tabs for 'Problem', 'Tutor', and 'Legend'. The 'Tutor' tab is active, showing a timestamp of 5:24:08 PM and an 'Evaluation Results' table. The table has four columns: '#', 'INPUT', 'EXPECTED OUTPUT', and 'ACTUAL OUTPUT'. The first row shows the input 'Let\s "C"!' and the actual output 'Let\s "C"!'. Below the table, a message states: 'Your program passed 1 out of 1 hidden test case(s). NOTE: These may not be the only hidden test cases that your program be evaluated upon.' A second evaluation result is shown below with a timestamp of 5:23:51 PM, indicating the same success. On the right, the code editor shows a C++ program:

```
1 #include<iostream>
2 using namespace std;
3
4 int main(){
5
6     cout << "Let\s \"C\"!";
7
8
9
10    return 0;
11 }
```

 A green floating notification in the top-right corner reads: 'Congratulations! Your program has passed all test cases. You can now submit this program.' At the bottom, the console shows the output: 'Compiled successfully. Execution succeeded. Program accepted. Program accepted.'

Submit Your Code

- Never forget to submit your code, even if it is incomplete, before the event ends
- However, it is not necessary to submit a code to start attempting another question. But do save it before leaving
- Code that is not submitted can not be evaluated
- To submit, click on **Submit** option in the **File** tab



The screenshot shows the Prutor online code editor interface. The browser address bar displays <https://cs101.cse.iitb.ac.in/editor/3189>. The editor has a menu bar with 'File', 'Run', and 'Help'. The 'File' menu is open, showing options: 'New File', 'New Folder', 'Save', 'Submit', 'Download', and 'Upload'. A blue arrow points to the 'Submit' option. The code editor contains the following C++ code:

```
1 #include<iostream>
2 using namespace std;
3
4 int main(){
5
6     cout << "Let\s \"C\"!";
7
8
9
10    return 0;
11 }
```

The evaluation results table shows the following data:

| # | INPUT | EXPECTED OUTPUT | ACTUAL OUTPUT | |
|---|--------------|-----------------|---------------|---|
| 1 | Let\s \"C\"! | Let\s \"C\"! | Let\s \"C\"! | ✓ |

Below the table, a message states: "Your program passed 1 out of 1 hidden test case(s). NOTE: These may not be the only hidden test cases that your program be evaluated upon." The console at the bottom shows the output: "Let\s \"C\"!".

Homepage After Submission

- After submitting your code, the homepage will mark your question as **submitted**

Applications Places

Prutor - Mozilla Firefox

Prutor

https://cs101.cse.iitb.ac.in/home

Prutor CS101

CodeBook Practice Scratchpad Student 1

Ongoing Event

test1

Ends on Fri Jan 01 2016 at 21:5

| | | | |
|----|-----------|---------------|--------------|
| Q1 | 20 Points | submitted | Start Coding |
| Q1 | 20 Points | not-submitted | Start Coding |
| Q2 | 20 Points | submitted | Start Coding |
| Q3 | 20 Points | submitted | Start Coding |
| Q4 | 20 Points | not-submitted | Start Coding |

Course Statistics

Course Problems

| | |
|---------------|---|
| Submitted | 3 |
| Not Submitted | 2 |

Course Events

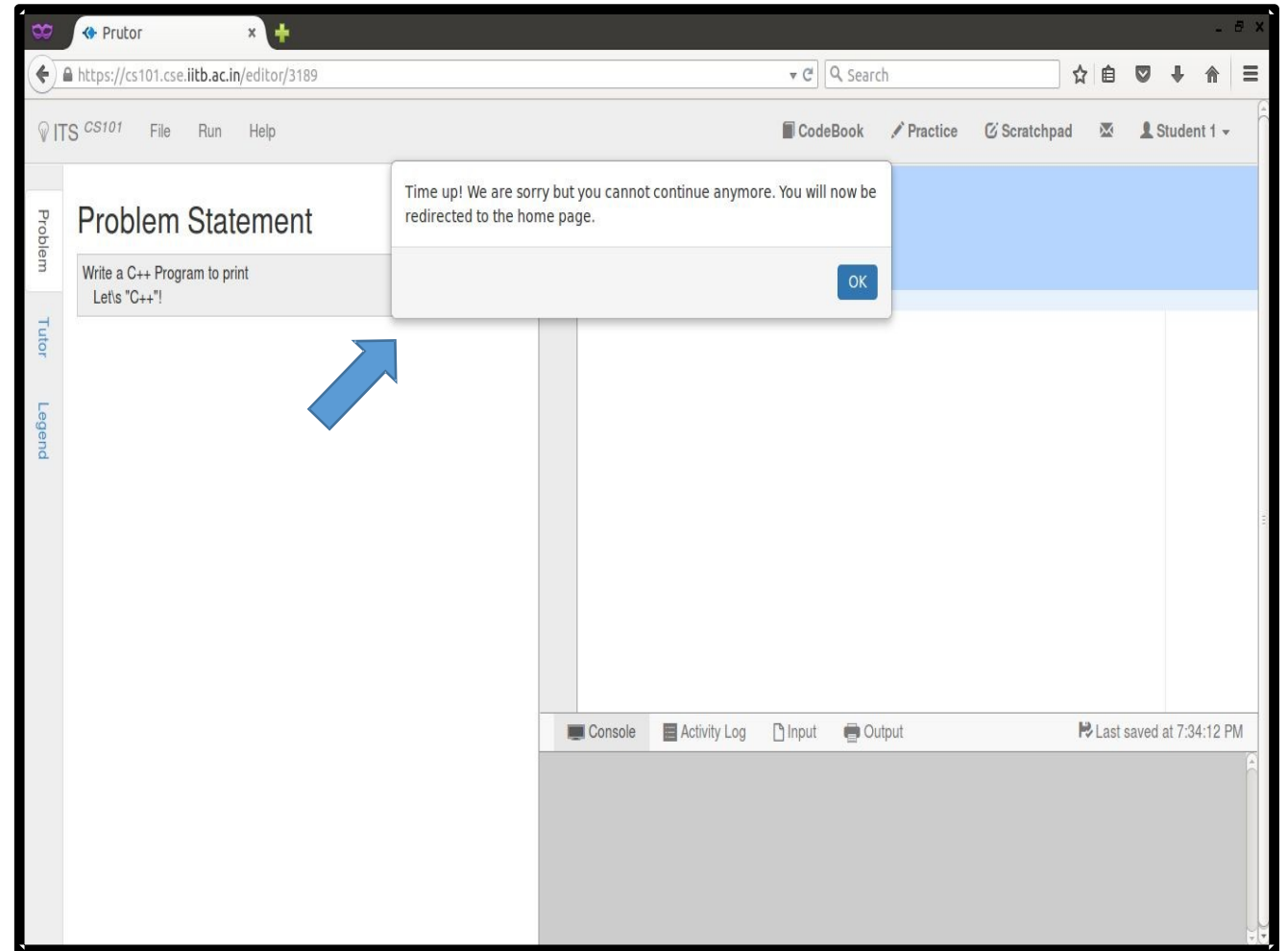
| | |
|---------|---|
| Labs | 1 |
| Exams | 0 |
| Quizzes | 0 |

GRADE CARD

Prutor - Mozilla Firefox Prutor Admin - Mozil... Pictures prutor-8.png

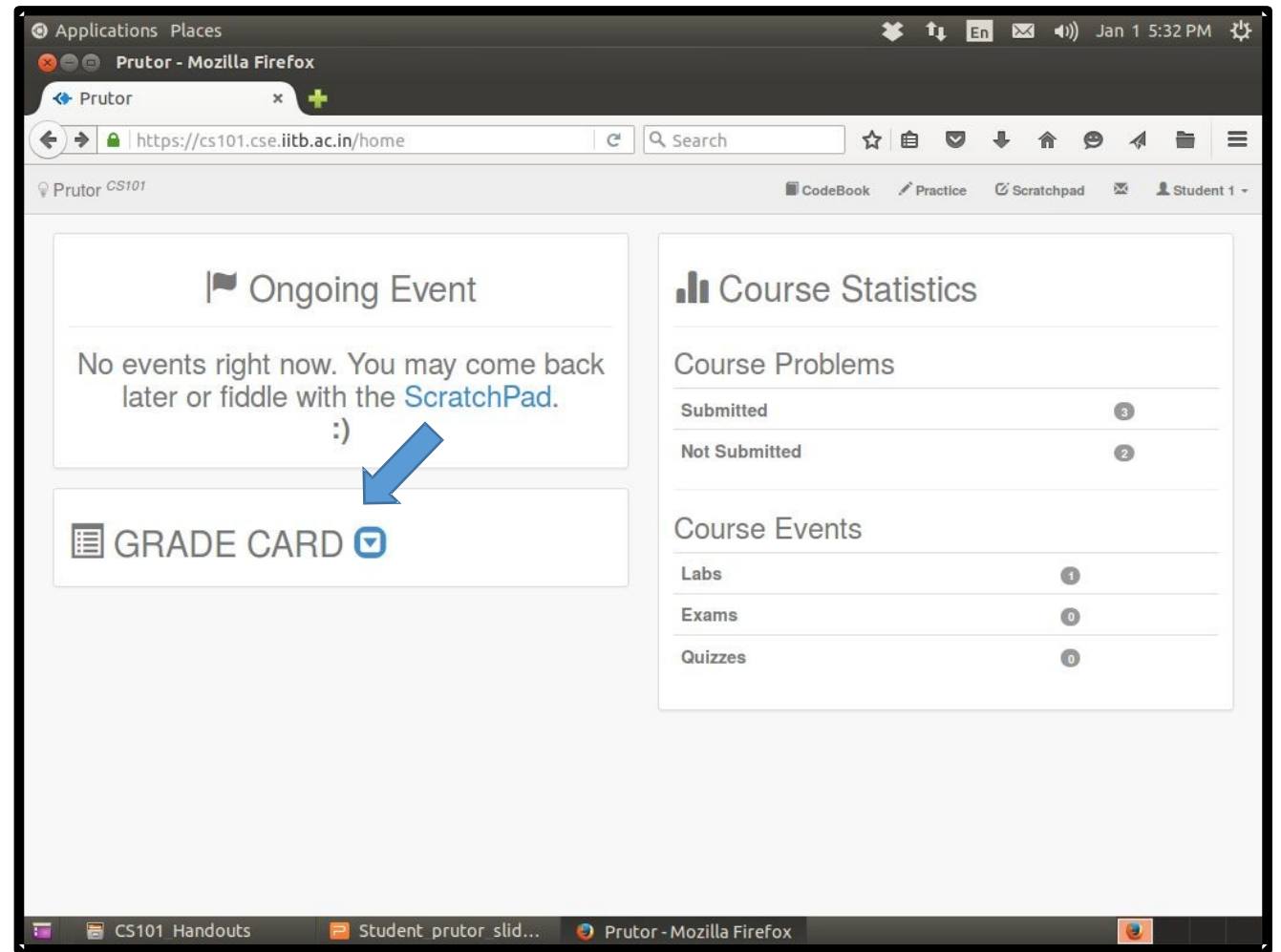
End of Event (1)

- You have limited time to write the code for all questions.
- You will be intimated through a floating notification when you have only 30 minutes left
- When the **time is up**, you will get a notification and you will **not be allowed to edit the code any more**
- You will be redirected to your homepage



End of Event (2)

- After an event finishes, it stops showing on your homepage (i.e. it is not accessible to you)
- You can view your submitted code after the lab week is over (i.e. all batches have finished the same lab) by visiting your **Codebook**
- Once the grading is done, you can view your marks by clicking on the arrow button next the **Grade Card**



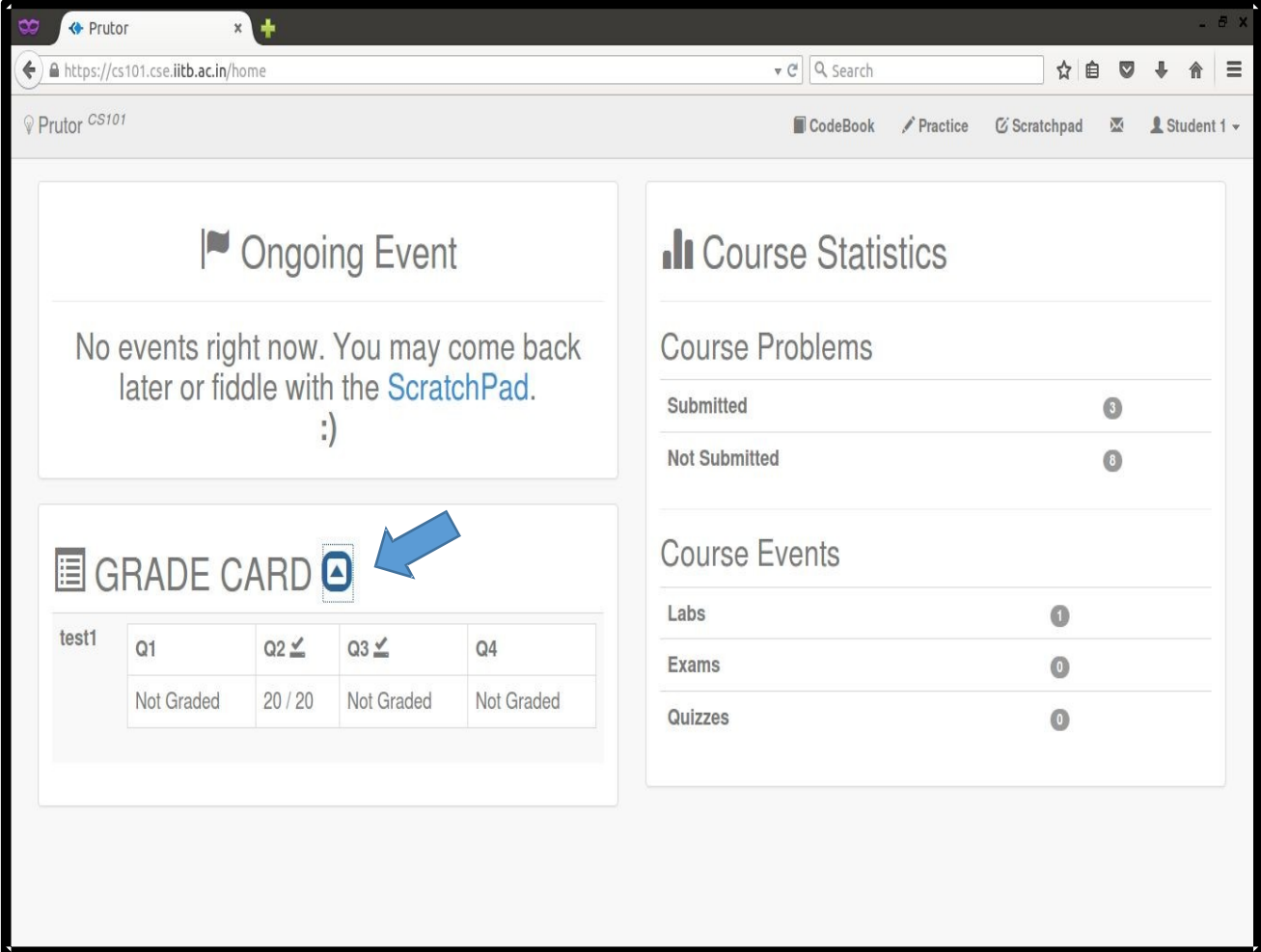
The screenshot shows the Prutor CS101 homepage. The browser address bar is <https://cs101.cse.iitb.ac.in/home>. The page features a navigation bar with 'CodeBook', 'Practice', 'Scratchpad', and 'Student 1'. The main content area is divided into two columns. The left column has an 'Ongoing Event' section with a message: 'No events right now. You may come back later or fiddle with the ScratchPad. :)'. Below this is a 'GRADE CARD' button with a blue arrow icon. A blue arrow points from the text 'ScratchPad' in the message to the arrow icon on the 'GRADE CARD' button. The right column has a 'Course Statistics' section with a bar chart and a table for 'Course Problems' and 'Course Events'.

| Course Problems | |
|-----------------|---|
| Submitted | 3 |
| Not Submitted | 2 |

| Course Events | |
|---------------|---|
| Labs | 1 |
| Exams | 0 |
| Quizzes | 0 |

Graded Questions

- When your question is graded the marks are shown in the **GRADE CARD** box
- Only the Q2 is evaluated in this screenshot. The other questions are yet to be evaluated (or the student did not submit the code)



The screenshot shows the Prutor CS101 interface. At the top, there is a navigation bar with 'Prutor CS101', 'CodeBook', 'Practice', 'Scratchpad', and 'Student 1'. The main content area is divided into three sections:

- Ongoing Event:** A box with a flag icon and the text: "No events right now. You may come back later or fiddle with the [ScratchPad](#). :)"
- Course Statistics:** A box with a bar chart icon and the title "Course Statistics". It contains two rows: "Submitted" with a count of 3, and "Not Submitted" with a count of 8.
- Course Problems:** A box with the title "Course Problems" and a table showing the status of various problem types.

The "Course Problems" table is as follows:

| Submitted | Count |
|---------------|-------|
| Submitted | 3 |
| Not Submitted | 8 |

Below the "Course Problems" section is the "Course Events" section, which contains a table:

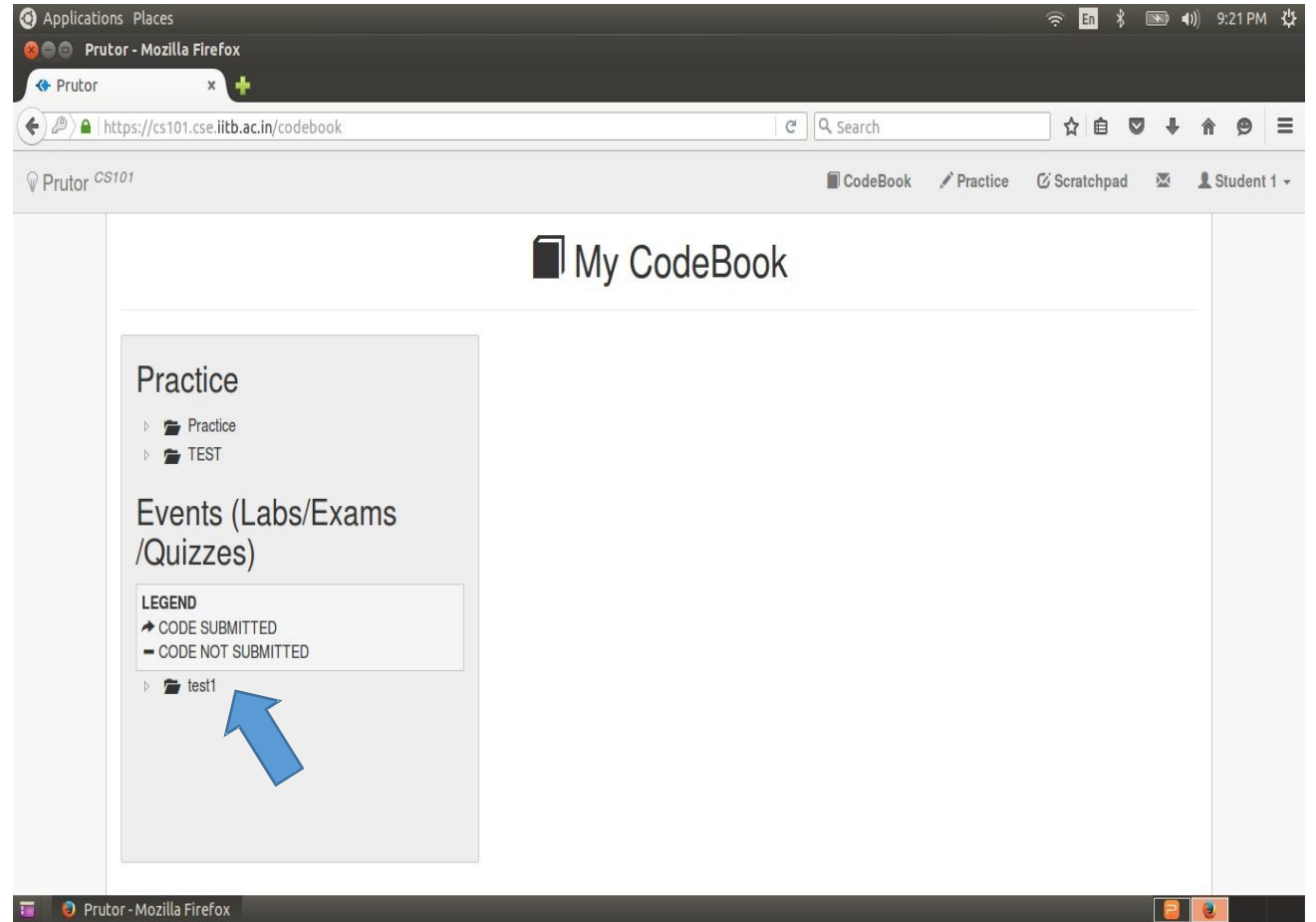
| Course Events | Count |
|---------------|-------|
| Labs | 1 |
| Exams | 0 |
| Quizzes | 0 |

The "GRADE CARD" section is highlighted with a blue arrow. It features a table for "test1" with columns for Q1, Q2, Q3, and Q4. The Q2 column shows a checkmark and "20 / 20", while Q1, Q3, and Q4 show "Not Graded".

| test1 | Q1 | Q2 ✓ | Q3 ✓ | Q4 |
|-------|------------|---------|------------|------------|
| | Not Graded | 20 / 20 | Not Graded | Not Graded |

CodeBook (1)

- Here you can see the questions you have attempted in the **test1**
- Click on the question to see your submitted code and the **evaluator's remarks**, if any



CodeBook (2)

- This page gives the details of the problems attempted and grading status, if the problem is part of a **Graded Lab**
- You can view the evaluator's remark at the bottom
- In the last text box you can send a **Request** for re-evaluation of your code
- Re-evaluation request can be made only once for a question

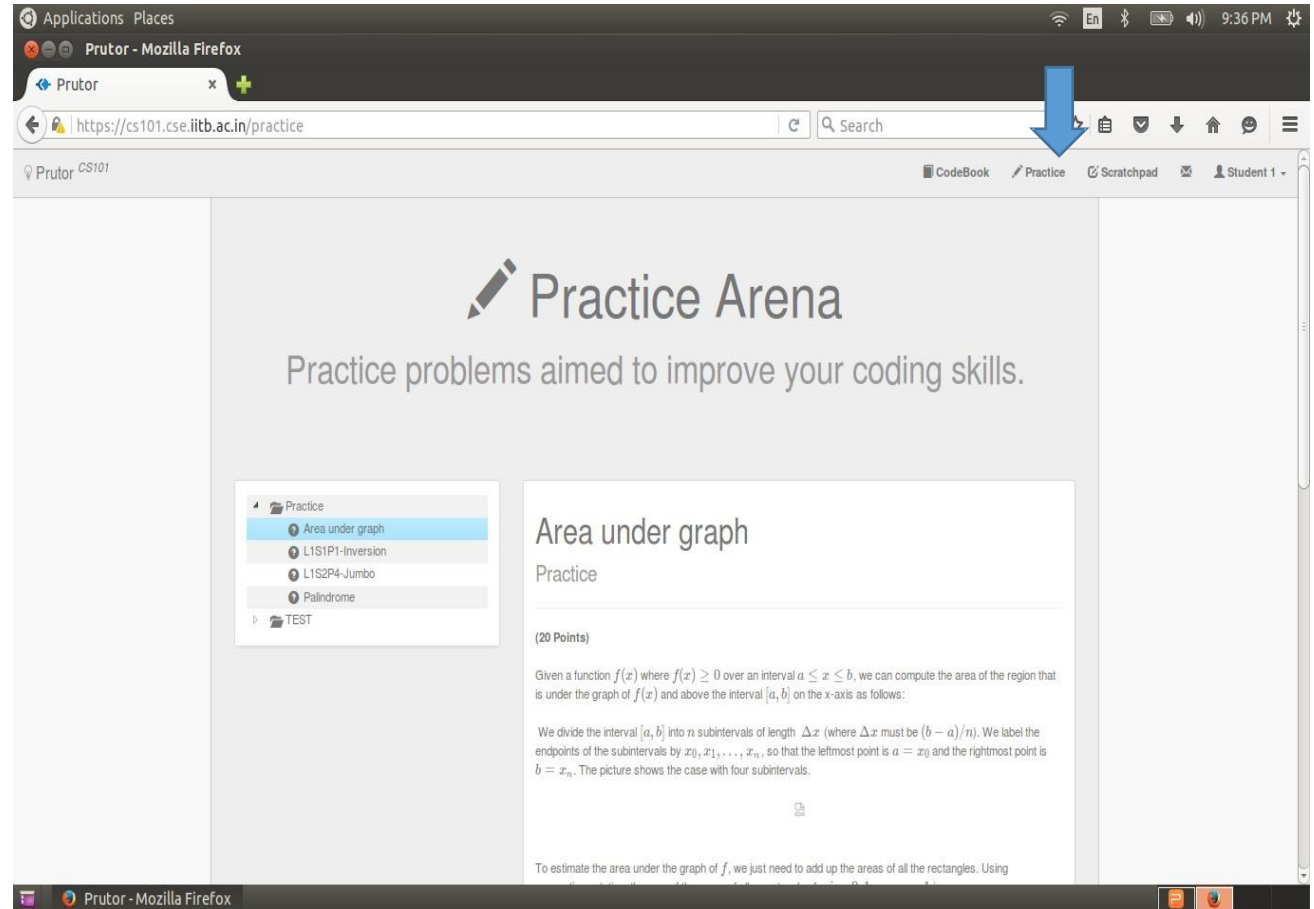
The screenshot displays the Prutor CodeBook interface in a Mozilla Firefox browser. The address bar shows the URL <https://cs101.cse.iitb.ac.in/codebook>. The page content is divided into several sections:

- Practice**: A sidebar menu with a tree view showing a list of practice problems. The problem "print-Mon-1" is selected and highlighted in blue. Two blue arrows point from this menu towards the main content area.
- Events (Labs/Exams/Quizzes)**: A section for tracking academic events.
- LEGEND**: A section with a tree view showing the status of code submissions, including "CODE SUBMITTED" and "CODE NOT SUBMITTED".
- #3189 print-Mon-1**: The main problem details, including the semester "SEM1-15-16-02" and the "PROBLEM STATEMENT": "Write a C++ Program to print Let's 'C++'!".
- YOUR CODE**: A text area containing the following C++ code:

```
1 #include<iostream>
2 using namespace std;
3
4 int main()
5 {
6     cout << "Let's 'C++'!";
7
8
9     return 0;
10 }
```
- GRADING STATUS**: A section indicating the current score: "This assignment has been awarded 15 marks out of 20." Below this is a text box for comments: "You can write the comment here regarding grading" and "You can write any comment here". A "Request Regrading" button is located at the bottom of this section.
- Assignment has been re-graded.**: A blue notification banner at the bottom of the problem details.

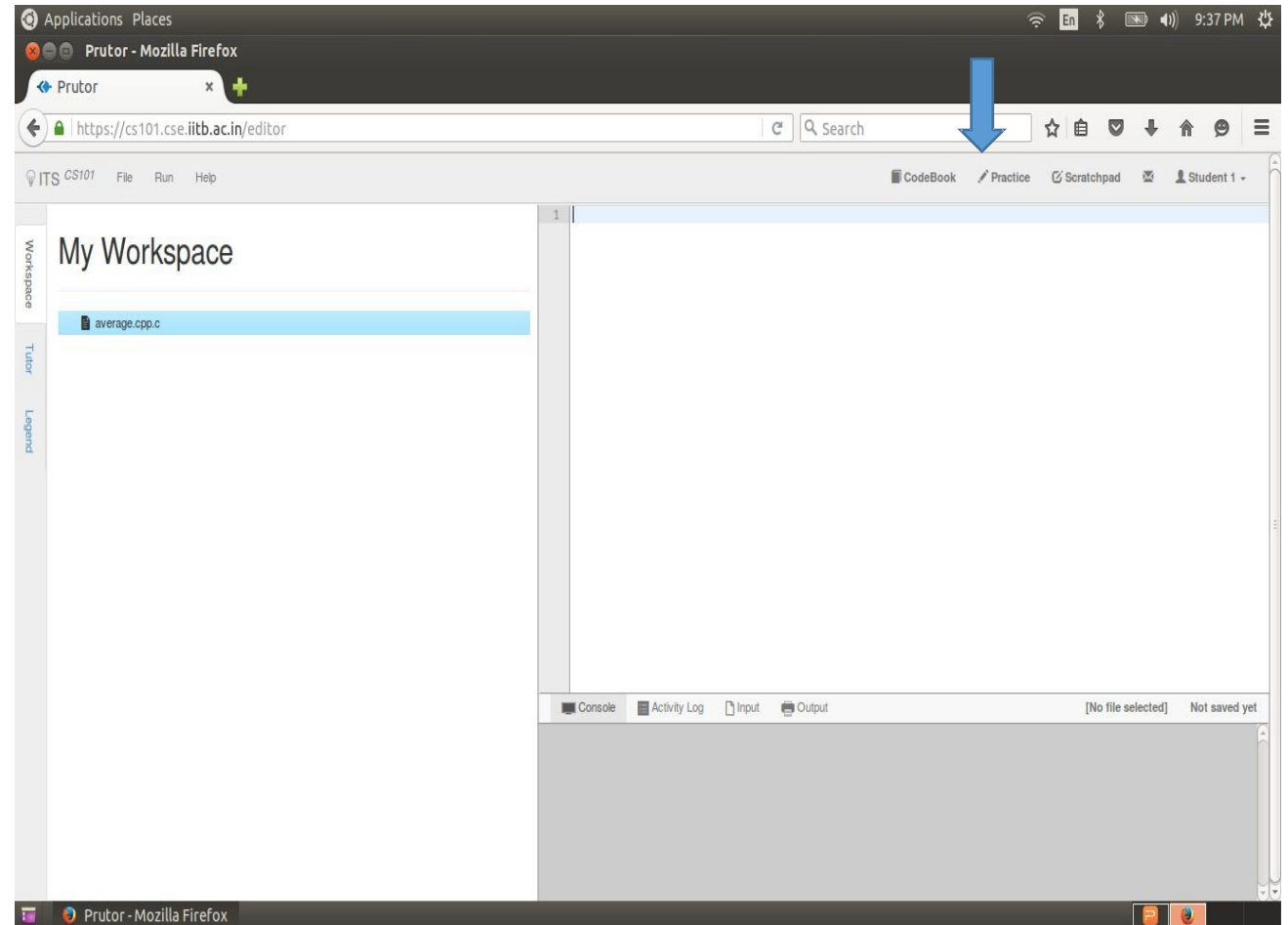
Practice

- You can use the **Practice Arena** to practice programming
- Here you get the same Code Editor where you can **Compile**, and **Execute** your code.
- This section will contain practice problems (along with test cases, if any)
- The code in the Practice Arena is not for submission



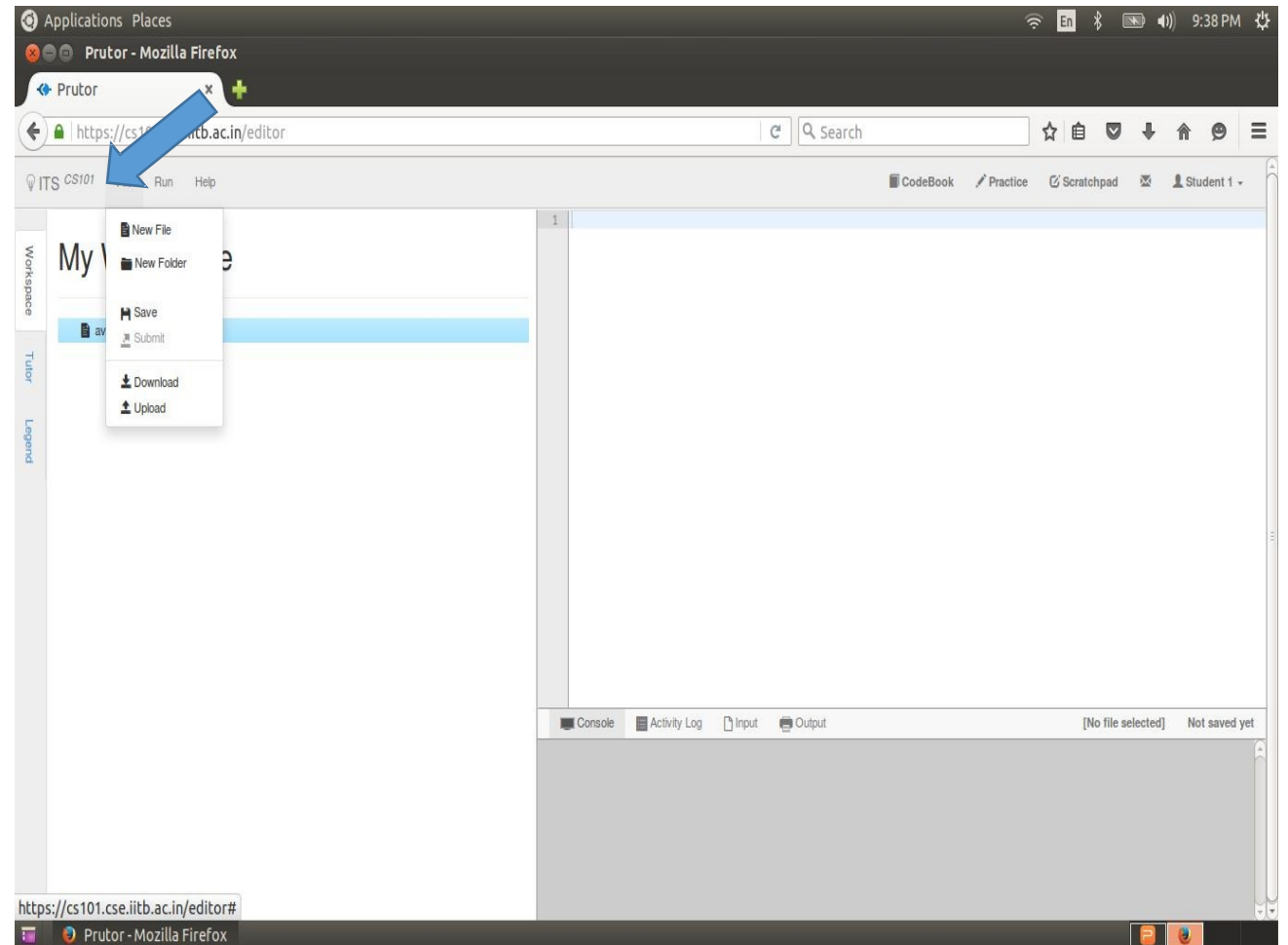
Scratchpad (1)

- You can use the **Scratchpad** to practise programming on your own (no questions are provided)
- You need to create a file before you can start editing
- Here you get the same **Code Editor** where you can **Compile**, and **Execute** your code



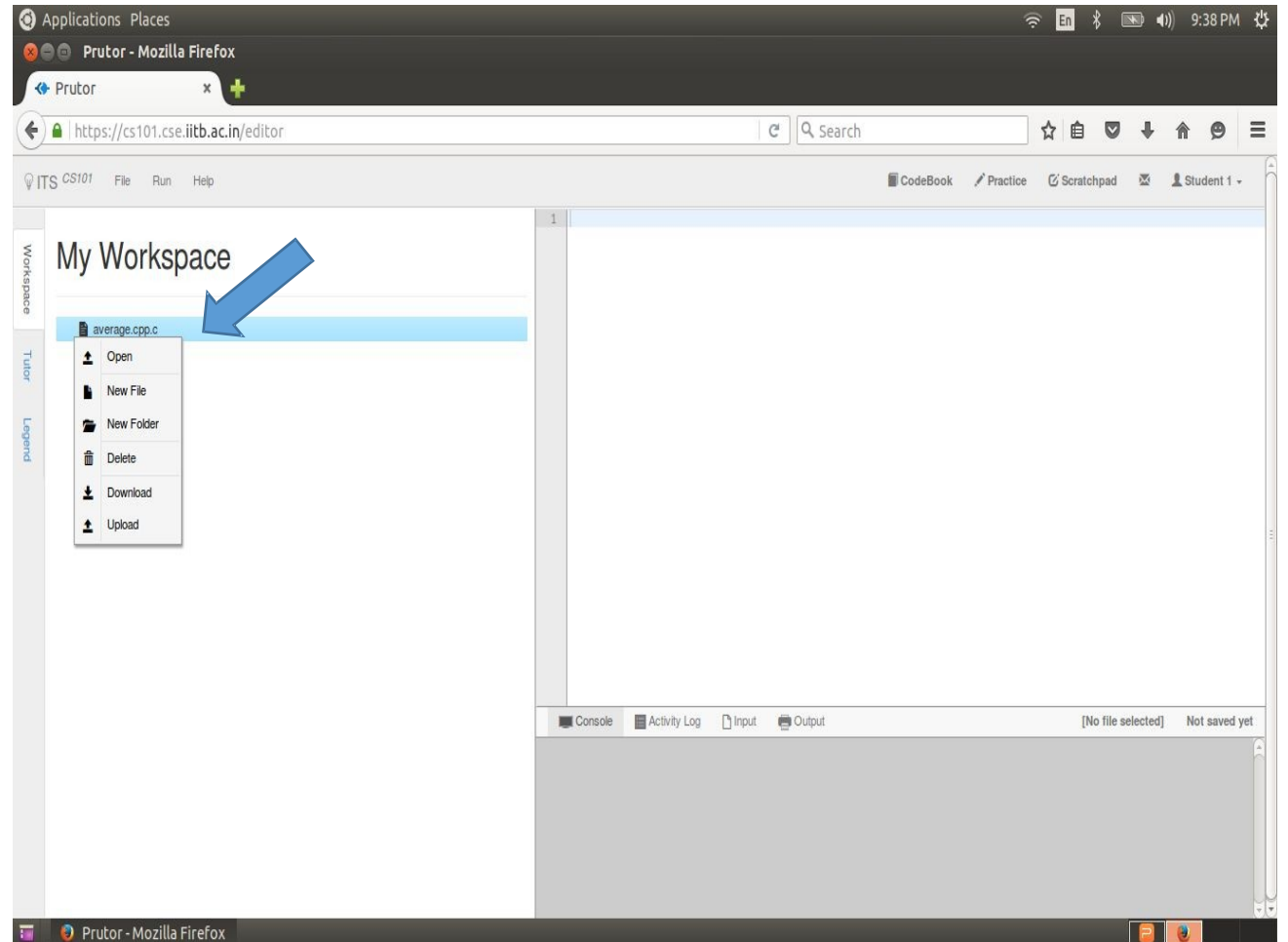
Scratchpad (2)

- You can add files and directories in the **Workspace** using the **File** tab
- If you don't know what files and directories are, don't worry right now. You will learn towards the end of the course. They are not needed right now



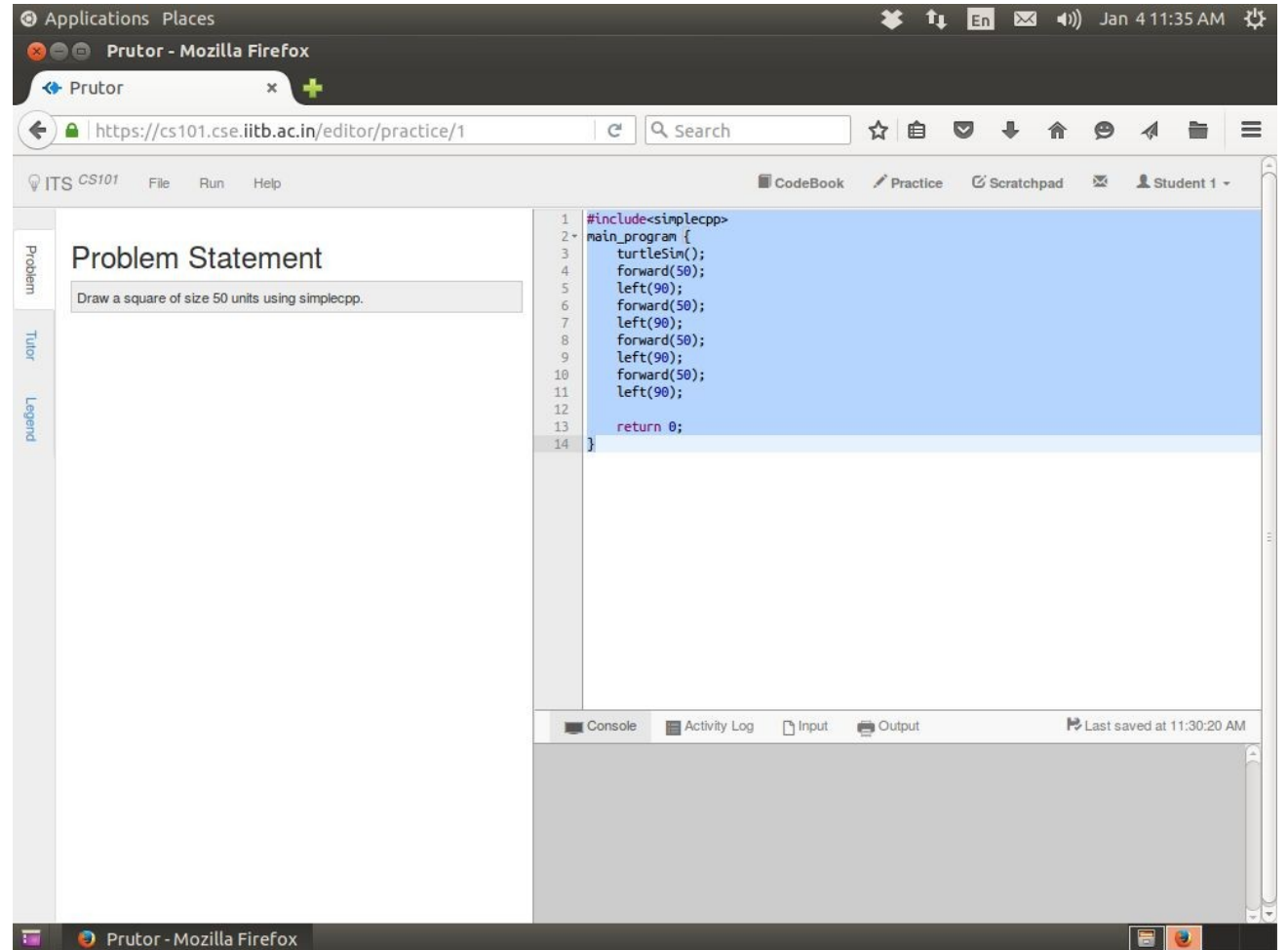
Scratchpad (3)

- You can **add** files and directories to a directory created earlier by using a right click on the names in the **Workspace**



Creating Simplecpp Programs

- You reach here by clicking the **Start Coding** link of a question
- The **Code Editor** saves your code every 5 seconds
- You can also save your code by pressing **Ctrl-s**
- Or you can save using the **Save** option of the **File** tab



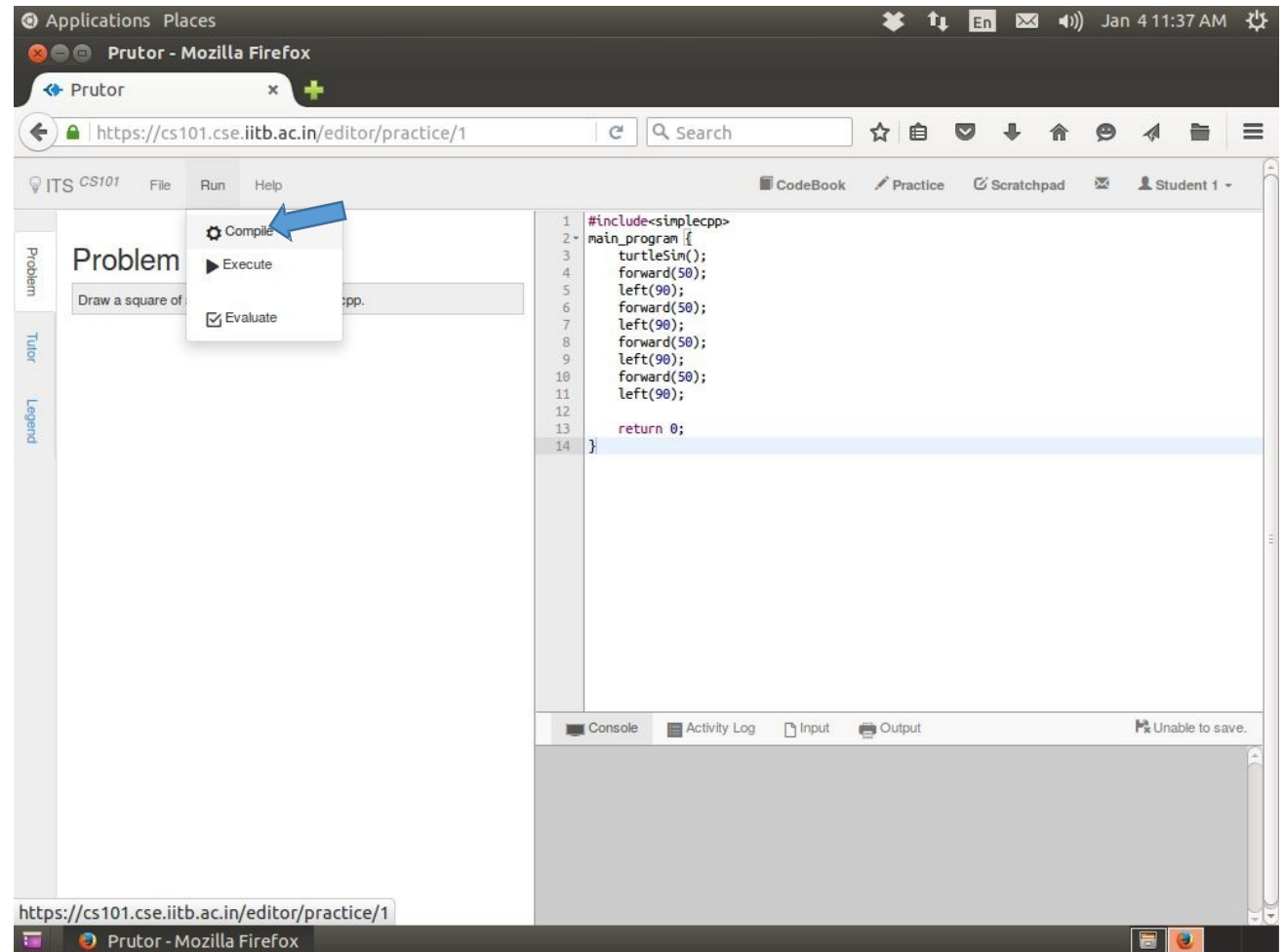
The screenshot shows the Prutor online code editor interface. The browser address bar displays the URL `https://cs101.cse.iitb.ac.in/editor/practice/1`. The editor window has a menu bar with 'ITS CS101', 'File', 'Run', and 'Help'. On the left, there are tabs for 'Problem Statement', 'Tutor', and 'Legend'. The 'Problem Statement' tab is active, showing the instruction: 'Draw a square of size 50 units using simplecpp.' The main area is a code editor with a light blue background, containing the following C++ code:

```
1 #include<simplecpp>
2 main_program {
3     turtleSin();
4     forward(50);
5     left(90);
6     forward(50);
7     left(90);
8     forward(50);
9     left(90);
10    forward(50);
11    left(90);
12
13    return 0;
14 }
```

At the bottom of the editor, there are tabs for 'Console', 'Activity Log', 'Input', and 'Output'. A status bar at the bottom right indicates 'Last saved at 11:30:20 AM'. The browser's taskbar at the bottom shows the Prutor - Mozilla Firefox window.

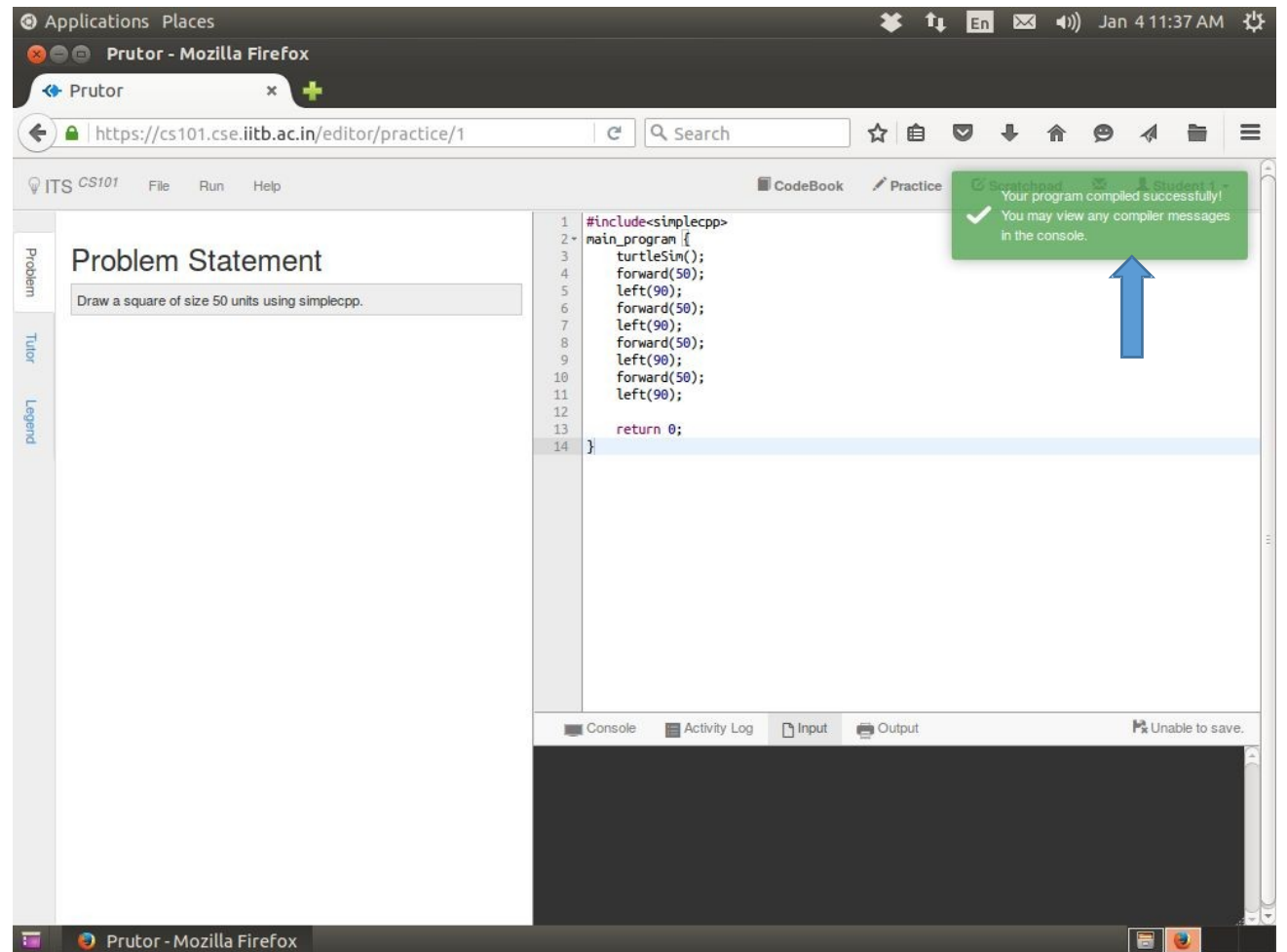
Compiling Simplecpp Programs

After writing the code, choose the **Compile** option in the **Run** tab



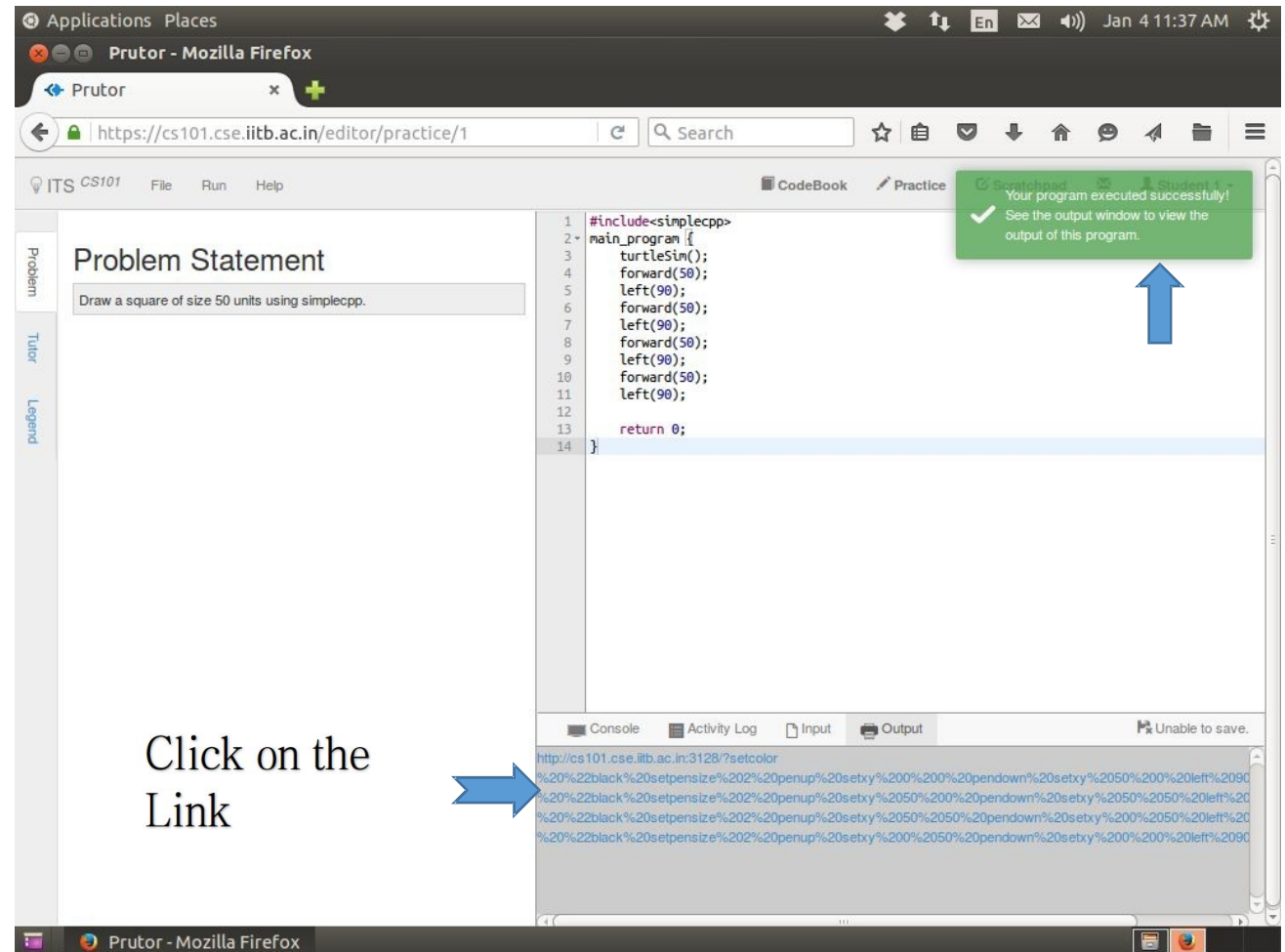
Successful Compilation

- The floating notification on top-right corner will notify you when your compilation is successful
- The color of the floating notification would be green



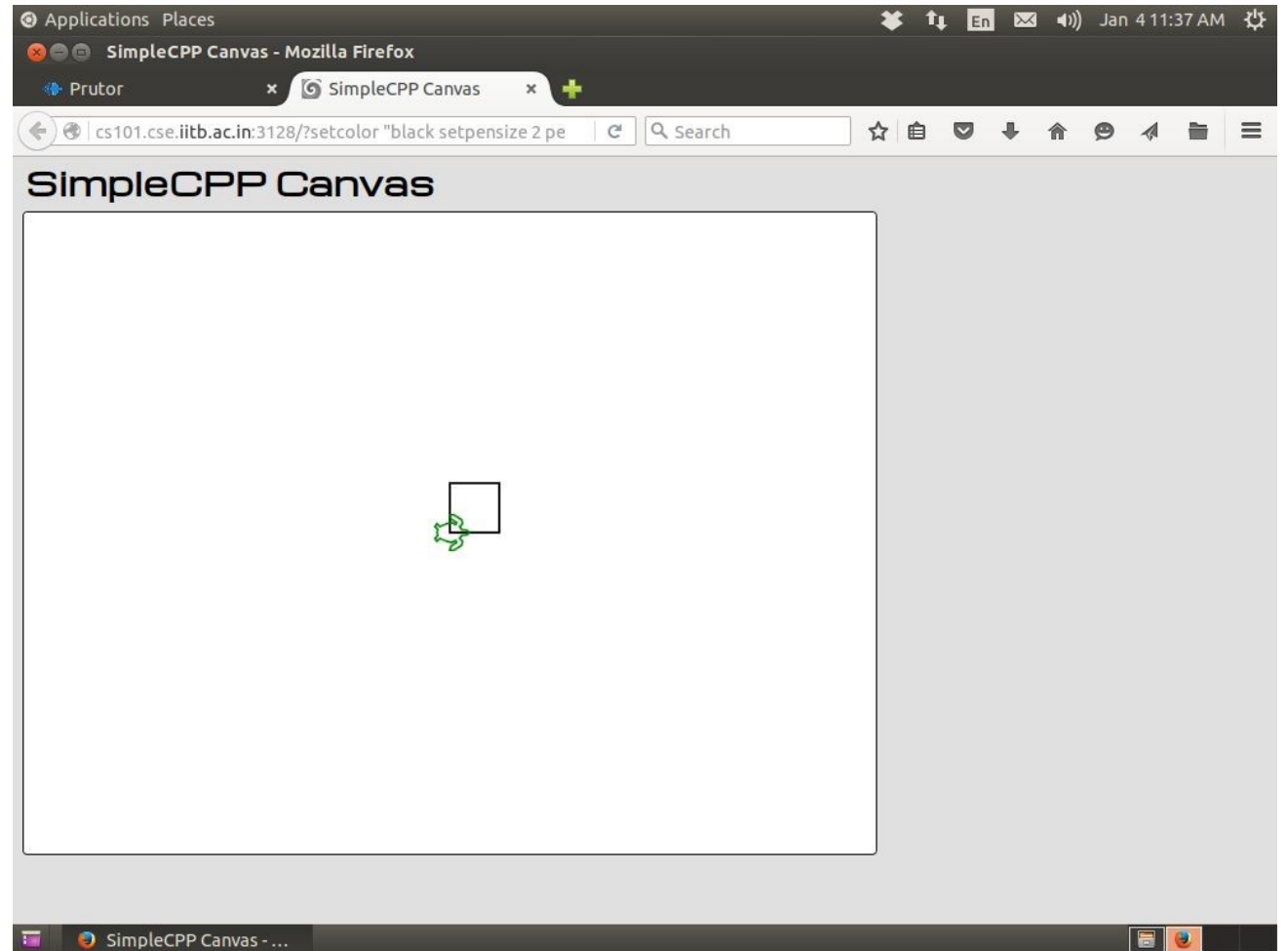
Executing Simplecpp Programs

- Click on **Execute** option in the **Run** tab to execute the program
- After successful execution, a **green floating notification** will appear on the **top-right corner** and a **link** will be shown at the **bottom**
- Click on the **link** in the output window to view the **ouput**



Viewing the Output of Simplecpp Programs

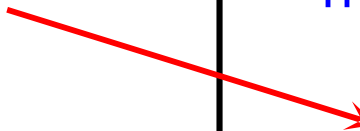
- You reach here by clicking the link in the output window



Prutor Does Not Support Interaction

- We cannot interleave input and output
- We cannot expect to see the output
 No. of sides?
 and give the input after it
- The console window is first used as an input window and then the same window is used as an output window
- Do not print any thing extra in the input window or console other than the input needed by the program
- Such an interaction is supported in the command line execution of programs

```
#include <simplecpp>
main_program{
    turtleSim();
    cout << "No. of sides?";
    int noofsides;
    cin >> noofsides;
    repeat(noofsides){
        forward(10);
        right(360.0/noofsides);
    }
}
```



Thank You

Happy Prutoring!