

CS19003 : Programming and Data Structures Laboratory

Section-10

Aritra Hazra,
Dept. of CSE, IIT Kharagpur

<http://cse.iitkgp.ac.in/~aritrah/course/lab/PDS/Spring2021/>

30-Mar-2021

Course Details

Class Timings: Online Live Class Sessions

Tuesday : 9:00am – 12:00pm (\pm 30 mins)

Webpage: (Visit for materials, announcements and updates)

<http://cse.iitkgp.ac.in/~aritrah/course/lab/PDS/Spring2021/>

CSE-Moodle Page: (Enroll for Assignment Submissions)

- Moodle-Page Link: Given in course-webpage
- Enrollment-Key: Shared through Email

MS-Teams Details: (for Every week's Live sessions)

- Team Name:
CS19003 Programming and Data Structures Laboratory (Spring 2021)
- Team-Link + Team-Key: Shared through Email
- Live Sessions Link: Given in course-webpage

Rules of the Game: (we expect discipline and fair-play from you!)

- Attendance: Mandatory to join Live Sessions
- Plagiarism: Strict Penalty (sharing & copying both)
- Integrity: We have faith and full trust on you!

Instructor and Teaching Assistants

Instructor: Dr. Aritra Hazra (Assistant Professor, CSE)

Email: aritrah@cse.iitkgp.ac.in

Office: CSE-102, Ground Floor, CSE Dept.

Teaching Assistants (TAs):

- Alapan Kuila [alapan.cse@gmail.com]
- Anupam Mondal [anupam17it@gmail.com]
- Harshit [harshit3598@gmail.com]
- Ipsita Koley [ikipsita@gmail.com]
- Paramita Koley [paramita2000@gmail.com]
- Rohit Kumar [rohitkumar5495@gmail.com]
- Sayantan Adak [sayantanadak.skni@gmail.com]
- Siddharth D Jaiswal [siddsjaiswal@gmail.com]

Role of TAs:

- Responsible to help out a group of students (group information given in course page and last slide)
- Resolve your queries via separate MS-Teams channels (group-wise TA list given in course page and last slide)
- Evaluate your assignment submissions every week (preferably complete before next week's lab session)

Lab Schedule, Tests and Evaluations ¹

Lab-Sessions / Assignments: (20 marks each, 1-2 Problems)

- 1 06-Apr-2021 : Data-types and Operators
- 2 13-Apr-2021 : Conditional Statements
- 3 20-Apr-2021 : Iterations and Loops
- 4 27-Apr-2021 : One-Dimensional Arrays
- 5 25-May-2021 : ** NO LAB (MIDSEM WEEK) **
- 6 01-Jun-2021 : Functions and Recursions
- 7 08-Jun-2021 : Pointers, Multi-Dimensional Arrays,
Dynamic Memory Allocation and Strings
- 8 15-Jun-2021 : Structures
- 9 29-Jun-2021 : File Handling
- 10 06-Jul-2021 : ** NO LAB (ENDSEM WEEK) **

Lab Tests: (40 marks each, 1-2 Problems)

- 1 Lab Test 1 (LT1) : 18-May-2021
- 2 Lab Test 2 (LT2) : 22-Jun-2021

Marks Distribution: Total Marks = 50 + 40 + 10 = 100

- 8 x Assignments (20 marks) = 160 marks
[best 7/8 will be scaled down to 50 marks]
- 2 x Lab Tests (40 marks) = 80 marks
[will be scaled down to 40 marks]
- Internal Evaluations (2 x Vivas) = 20 marks
[will be scaled down to 10 marks]

¹ Any change in dates will be announced in live sessions and also notified in course webpage.

Textbooks and References

- Brian W. Kernighan and Dennis M. Ritchie; “The C Programming Language”; Prentice Hall of India, 1988.
- E. Balaguruswamy; “Programming in ANSI C”; Tata McGraw-Hill, 2006.
- Byron Gottfried; “Schaum’s Outline of Programming with C”; Tata McGraw-Hill, 2018.
- Seymour Lipschutz; “Data Structures”; Schaum’s Outlines Series, 2017.
- Ellis Horowitz, Satraj Sahni and Susan Anderson-Freed; “Fundamentals of Data Structures in C”; W. H. Freeman and Company, 1993.
- R. G. Dromey; “How to Solve it by Computer”; Prentice-Hall of India, 2006.

What will happen in Lab Sessions everyday?

- You will join the lab sessions live every Tuesdays at 8:45am through MS Teams.
- I, being your instructor, shall describe the assignments to you and may discuss some basic details required to do the assignment work and other issues/logistics.
- You will work on the assignments and write programs (build and run) on your laptop/desktop using CodeBlocks (preferably).
- While you are working, you will run into problems surely.
 - You will first try to solve it yourself for some time at least, do not immediately ask anyone, that's how you learn.
 - Then you ask TAs (and me in case your issue remain unsolved).
 - We will also discuss some ways of going about it ...
- There will be Teaching Assistants (TAs) to help you. Each of you will be assigned to a specific TA. Each TA will manage a small group of 10 – 12 students (through separate MS-Teams Channels). The group information is provided in course page and in last slide.

What will happen in Lab Sessions everyday?

- You will submit the programs through CSE-Moodle.
 - You will submit **exactly one .c file** (file with name ending with .c) for **each** assignment.
 - You have to submit the .c file for each assignment separately against the link for that assignment.
 - After submission, open the file from CSE-Moodle to make sure you submitted the correct file; otherwise you can submit again, it will overwrite the previous version.
 - **All submissions must be through CSE-Moodle. We shall not accept any submissions sent by email. So, do not send your files to us by email directly.**
 - What you submit in moodle is what will be graded, so make sure you submit the right file and do submit (cross-check in case of doubts).
- We shall provide demo of all these steps today and let you practice it thoroughly.

What if you do not have have a laptop/desktop?

- **You must have one**, so get one. There is no other alternative in such online mode of study and doing PDS Laboratory.
- If you still do not have one, but will get it within 1-2 weeks
 - Use an online C compiler for the time being (first 1-2 classes)
 - https://www.tutorialspoint.com/compile_c_online.php
 - <https://www.programiz.com/c-programming/online-compiler/>
 - ... many others, just type “online C programming” in Google to search.
 - Apps are also available for smartphone, again just search for “C programming apps” on play store.
 - Then, type your C program in the window provided, and run.
 - After you are done, cut-and-paste you code in a text file. Make sure the file name ends with .c extension.
 - Submit the file in CSE-Moodle under proper place as suggested.
 - Though will mostly work, but more work (copy to file etc.), depends on net connectivity and small deviations in what runs and what doesn't may happen sometimes depending on the software.
- We shall test using the standard gcc compiler (CodeBlocks default setting also uses that).

How do you tackle the lab assignments everyday?

- The only recipe to do good programs is to practice more and more.
- Remember, everyday lab has assignments which will be marked. Hence, lab is not the only time when you should write programs – rather, you need to practice a lot yourself in order to perform well!
- After getting the problem statement for an assignment, try to read it thoroughly, categorize and separate out small subgoals and design them to link each other to produce the overall goal.
- Every time you complete small intermediate objectives, try to print and check whether that subgoal is properly achieved. Then, move on to the next subgoal step-wise to complete the problem.
- In the process, if you get compilation error or your output is not correct, debug the way we told you to in instructions.
 - If required, ask TAs (or even me) only after you tried yourself hard to solve your problem for sometime.
 - Do not get tense or hurry to finish if you face problems, remember you have enough time ($2\frac{1}{2}$ hours) for 1-2 assignments (only).
 - You will get Partial Marks for your efforts even if the program is not fully finished or correct (so, completing subgoals step-wise is important).

What you need to know about submissions?

- There will be entries created under CSE-Moodle to submit everyday lab assignment solutions.
 - For multiple problems/assignments, submit proper .c file for every assignment through appropriate links in CSE-Moodle.
 - Always submit whatever you can do. Your previous submission will get overwritten once you submit afresh.
 - Do not mess up and definitely cross-check your uploaded files.
- **Submission closes at 12:00pm**, so start submitting much before that, as it is recommended to avoid hassles at last minutes.
 - We **allow (only) 10 mins extra (after normal closing time)** for network or any other issues (which means we go **till 12:10pm**).
 - If you miss regular submission deadline, we **allow 1 hour more (i.e. till 01:10pm) to accept delayed submissions with 30% penalty**.
 - Server closes submission automatically after that time (01:10pm), so you will not be able to submit after that.
 - NO email submissions will be accepted or answered.

Writing a C program

- Required Software:
CodeBlocks (preferred) or any Coding Utility/IDE using gcc compiler
(Required information regarding installation and usage will be explained by TAs today and also provided as a summary in course page)
- Steps to be followed:
 - 1 Type in the program in a file
 - 2 Save the file with a name and .c extension
 - 3 Compile / Build
 - 4 Run / Execute
- C filenames MUST end with .c extension.
- CodeBlock allows the last two steps to be done separately or together with “Build and Run”
- When you type you C program, make sure to save the file every now and then (say 5 minutes) to avoid losing work in case there is any serious problem.

Hello World : Our First C Program

- Source Code: file `hello.c` contains the following lines:

```
/******  
* Name : YOUR FULL-NAME  
* Roll No : 20CS100XY / 20CS300XY  
* Section : 10  
* Assignment No : 0  
* Description : First C program  
* Date : 30-Mar-2021  
*****/  
  
#include <stdio.h>  
int main()  
{  
    /* check the indentation */  
    printf("hello world\n");  
    return 0;  
}
```

- Execution Output: shall print as output the string `hello world`.

Hello World : Program Explanation

- `/*...*/` : comment line not executed with program
- `#include <stdio.h>` : tells the compiler to include information about the standard i/o library
- `int` : a *data type* of C indicating integers
- `main()` : a special *function*. Every C program begins execution from the first line in `main`
- `printf()` : a *library function* that prints output
- `"hello world"` : character string to be printed
- `\n` : *newline character*
- `return` : value returned from the function `main()`

Your Group Information with Teaching Assistants

- Group-1** Alapan Kuila (Roll Range: 20AE10010 – 20BT30020)
[alapan.cse@gmail.com, alapan.cse@iitkgp.ac.in]
- Group-2** Anupam Mondal (Roll Range: 20CE10008 – 20CH30006)
[anupam17it@gmail.com, ANUPAM17IT@KGPIAN.IITKGP.AC.IN]
- Group-3** Harshit (Roll Range: 20CH30026 – 20EC10013)
[harshit3598@gmail.com, ysharshit@iitkgp.ac.in]
- Group-4** Ipsita Koley (Roll Range: 20EC10033 – 20EE10079)
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- Group-5** Paramita Koley (Roll Range: 20EE30016 – 20IM10003)
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- Group-6** Rohit Kumar (Roll Range: 20IM10022 – 20ME10094)
[rohitkumar5495@gmail.com, profroot@iitkgp.ac.in]
- Group-7** Sayantan Adak (Roll Range: 20ME30018 – 20MI33007)
[sayantanadak.skni@gmail.com,
SAYANTANADAK.SKNI@KGPIAN.IITKGP.AC.IN]
- Group-8** Siddharth D Jaiswal (Roll Range: 20MT10001 – 20QD30016)
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Please know your group number and TA name (as put up in course page).
Also, while TAs have been instructed to help you, please remember that they are students with their own works, so ask for help only after trying yourself.

Thank You

Here we go ...