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Manual for
Mathematics Laboratory

Contents

1. Introduction	2
2. Computer laboratory software	3
3. Login to client computer	4
4. Write C-programme in Code Blocks	5
5. Sample programming problems	6
6. Laboratory responsibilities for students	7

1. Introduction

Netaji Subhas Open University (NSOU) has several Mathematics laboratories in its Regional Centres in West Bengal like at Durgapur and Kalyani. These laboratories consist of large number of client computers attached with a main server and also with a centralized power supply system. All these computers are equipped with modern technologies and soft wares.



Picture 1: The main server.

The computer laboratory has 24- hours' continuous power supply. There are a projector and a white board in the laboratory. Each client computer has Microsoft Windows 10 operating system. The main purpose of NSOU's Mathematics laboratory is to conduct Laboratory Counselling -cum- Evaluation Session (LCES)



Pic 2: Centralized UPS

for Undergraduate BDP Mathematics students and also to train Post Graduate Mathematics (PGMT) students in numerical programming. After the completion of the training of PGMT student, a certificate is also provided to them.



Picture 2: Computer laboratory

2. Computer laboratory software

The main purpose of this laboratory is to train students to learn computer programming to solve different problems of numerical analysis. To do this work, “C-programming” compiler is used. Some softwares used in this laboratory are

1. Microsoft Office 2016
 - a. Word Processor
 - b. PowerPoint
 - c. Excel
2. CodeBlocks (C-compiler)
3. Internet connectivity software (Google chrome, Firefox)

3. Login to client computer

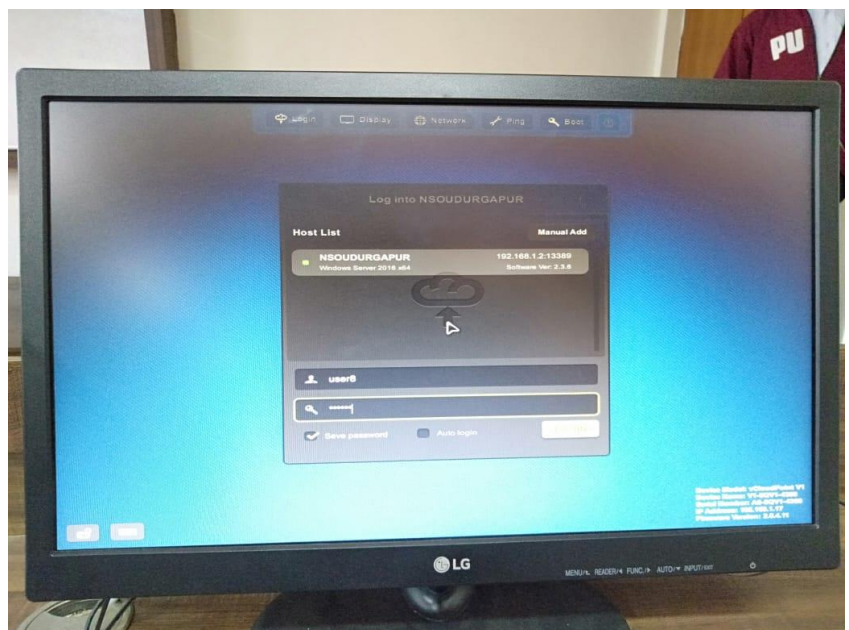
These instructions describe the process of logging in and out and switching users in client computers:

1. Press the power button on the back side of the monitor, see picture 3



Picture 3: Power button

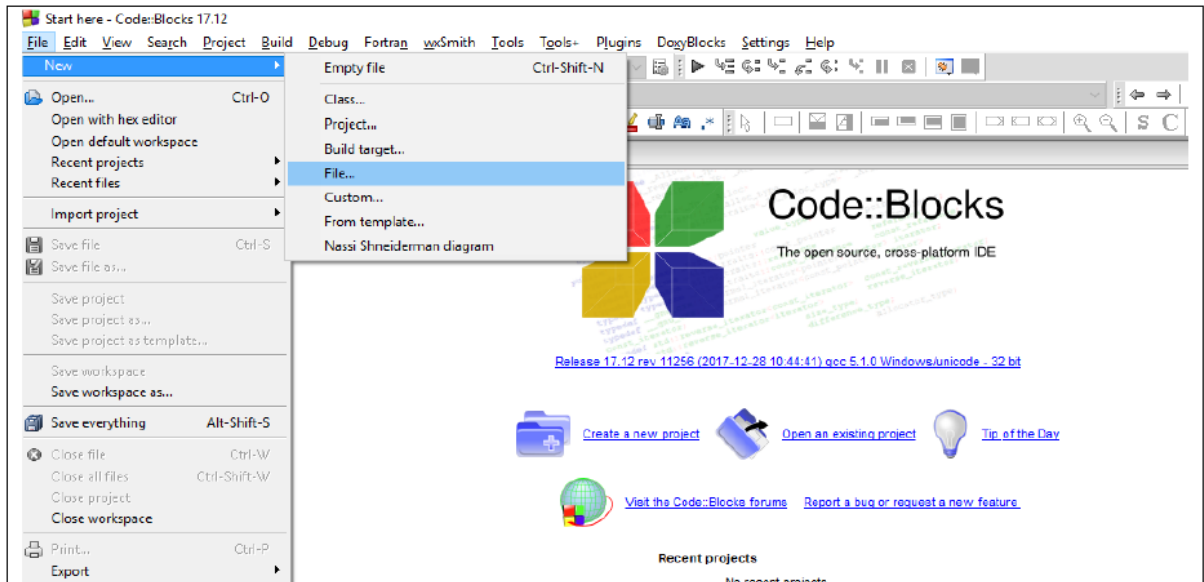
2. A login screen will appear, see picture 4.
4. Each client has separate username and password. Enter the username and password and then click login.
3. After login the desktop will appear.



Picture 4: login page

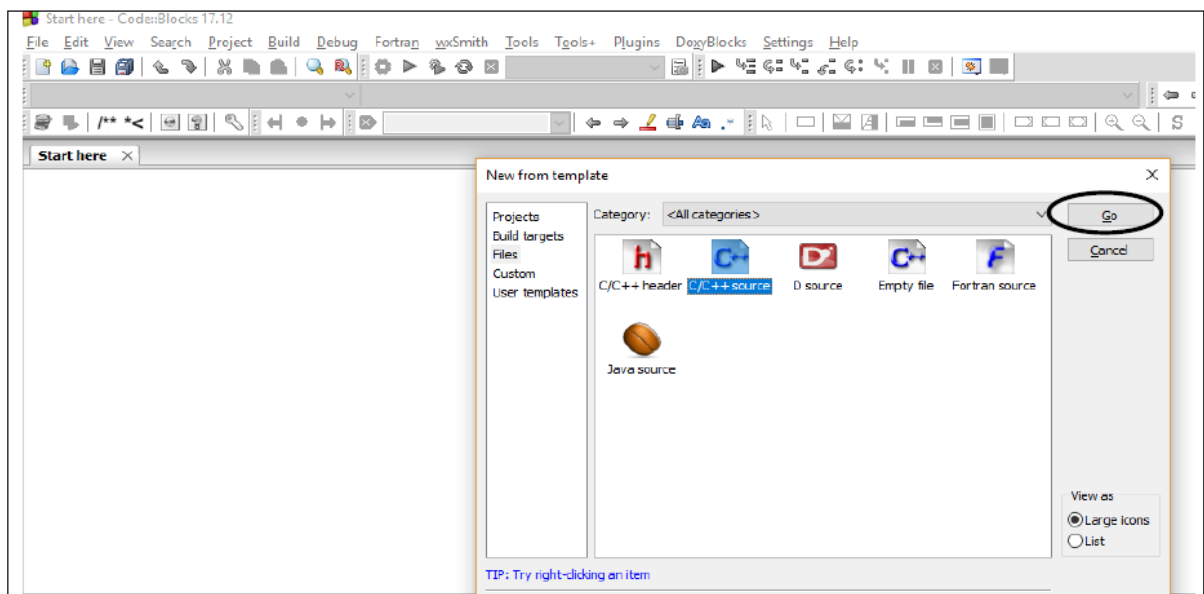
4. Write C-programme in CodeBlocks

1. Click on the CodeBlock IDE installed in the machine. The screen opens up which is shown in picture 5. Go to the file option in the top left corner. Then go to File → New → File.



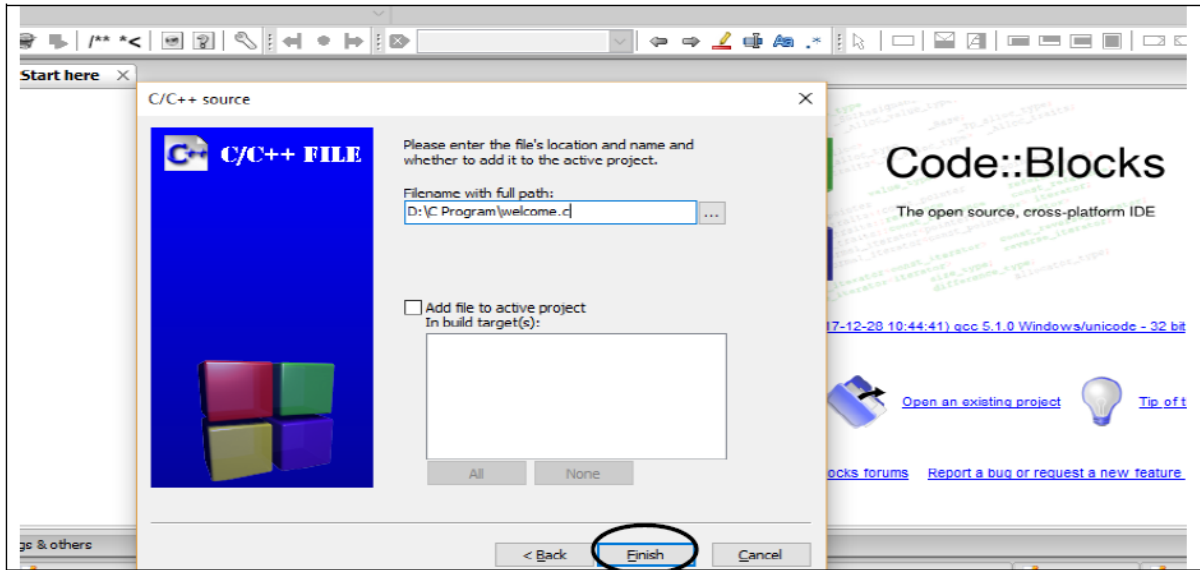
Picture 5

2. On clicking the File option, a list of source options appears. Select the option C/C++ source (Picture 6) and then click on 'Go'.



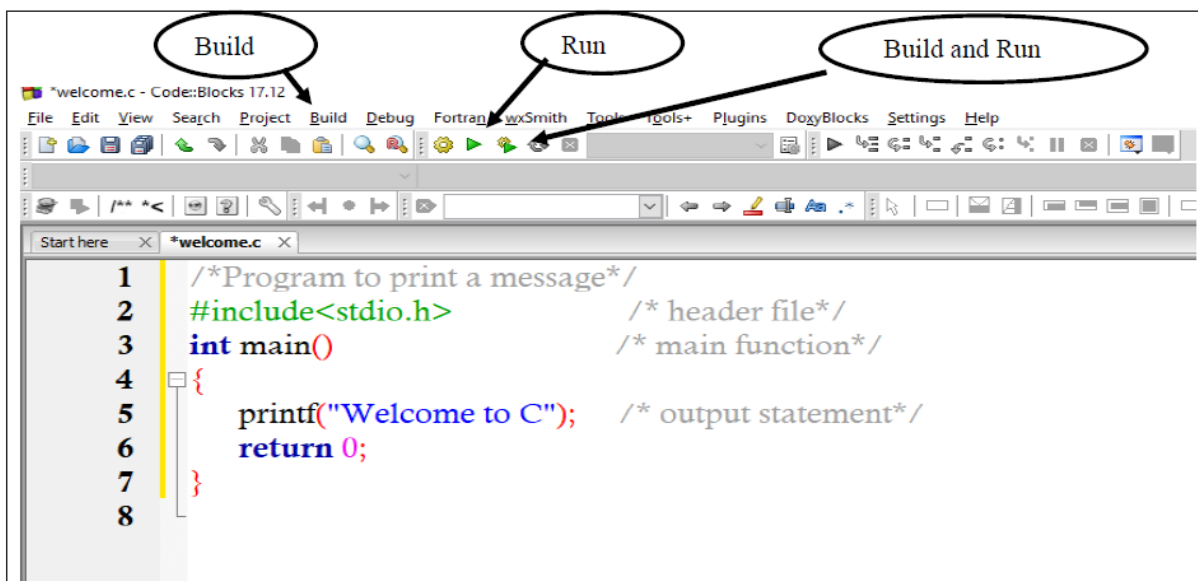
Picture 6

3. The C/C++ source wizard opens up. Click on Next. Select the language as C and click on Next. Enter the file name with full path in C/C++ source wizard (Picture 7). Then click finish.



Picture 7

4. Now write the C-programme in the workspace and then click 'File' and then 'Save' option. Once the program is complete then it needs to be compiled and then run. Click 'Build' and 'Run' option, see Picture 8.



Picture 8

5. Sample programming problems

Here are some sample programming problems for solving different problems of Numerical Analysis by Computer laboratory practical:

1. Solution of a system of linear equations by Gauss – Seidel method

2. Initial Value problems for first and second order ordinary differential equation (O.D.E.) by Runge – Kutta method
3. Numerical integration by
 - i. Trapezoidal method,
 - ii. Simpson 1/3 method,
 - iii. Newton Cotes formula
4. Solution of equation by
 - i. Fixed point iteration method
 - ii. Newton Raphson method
 - iii. Regula-Falsi method
5. Numerical solution of Differential equation
 - i. Euler's method
 - ii. Taylor series method
 - iii. Runge- Kutta method

6. Laboratory responsibilities for students

1. Teachers/ Instructors shall closely monitor the conduct of their students while they are inside the laboratory. The Instructor should not leave the class during the instructor's assigned laboratory hours.
2. The student must check the computer unit and its peripherals attached before using it. The student must immediately inform the instructor if there's any defect, error or damage observed at the computer (hardware/software) assigned or if there are any missing peripherals (mouse, keyboard, etc.).
3. Students are not allowed to bring bags, food and beverages inside the laboratory. Chewing gum, eating, drinking, smoking, littering are prohibited inside the computer laboratory.
4. No one is allowed to alter or delete configuration settings of any computer laboratory equipment. Tampering, deleting or modifying CMOS/BIOS settings, IP Configuration, system parameters, or system files stored in the hard disk are strictly prohibited.
5. No student or personnel shall be allowed to attach or detach any peripheral to and from any IT equipment or devices without explicit permission from the instructors. Users are not allowed also to attach personal devices (like hard drive, pen drive, CD etc.) in any computer laboratory's network without permission from instructors.

6. Accessing Pornographic, Gambling, Hate/Discrimination, torrent and other unsafe sites is strictly prohibited and punishable.
7. Users are not allowed to install, update or download any software in any computers inside the laboratories. It is also prohibited the users to boot from any bootable devices to run software in any computers in the laboratory.
8. Playing games are not allowed inside the computer laboratory, this includes video games, card games and other games.
9. Student should enter the laboratory room with proper documents such as enrolment ID.
10. Anyone who is causing disturbance, trouble and exhibiting hostile or threatening behaviour will be asked to leave the computer laboratory.
11. Printing of manuscripts, business letters, banners, personal documents and research works are not allowed in the laboratory. With permission from the instructor, only the printing of program listings is allowed using the laboratory printer.
12. Each user may only use one computer at a time.
13. No student is allowed to enter in the server room without any permission.
14. After the class is over, student should properly turn off the machine.
15. Before leaving the laboratory student should check that no trash is left behind and the sitting chair is properly arranged.
16. Store any personal data on a removable device. Do not leave files on laboratory computers. The university does not accept any liability for loss of data that was left behind or inadequately stored.
17. **Theft, vandalism, or abuse in any form is a grave offense and shall be dealt with accordingly.** Wilful violations of the above provisions shall constitute disciplinary actions. Violators of these guidelines may be subject to any, but not limited to, the following sanctions:
 - i. Admonition
 - ii. temporary or permanent suspension of computer laboratory privileges
 - iii. dismissal from the university.
18. Treat the computers with respect. If you get mad at something that is not working, don't bang on the keyboard.

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