DIGITAL LOGIC SIMULATOR USER'S MANUAL

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1.0 GENERAL INFORMATION

1.1 System Overview

This is a simulator for logic gates that allows hardware circuits to be designed and tested. Although it is software for the purpose of simulating hardware, the user interface would be intuitive enough to simulate the actual laboratory environment on a computer screen, reinforcing a close identification between hardware and software.

This is a standalone application, mainly designed to be run on windows operating system. The Simulator provides a Graphical User interface.

This software was made at DA-IICT during Jan-05 – Apr-05, as the part of Software Engineering Course Requirements. The Team responsible for the software is known as 'Solutions Group'.

It is an operational system.

1.2 Point of Contact

For any Informational and Troubleshooting purposes following persons can be contacted:

Solutions Group,

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2.0 SYSTEM SUMMARY

2.1 System Configuration

The Simulator is a standalone System, to be used on windows platform. No communication interfaces are required. A printer would be useful incase the schematics are required to be printed.

2.2 Data Flows

In a typical session, user opens the application and works on the system, and can save the work in form of files. These files can be retrieved later, and also could be transported through email or file sharing.

2.3 User Access Levels

Digital Logic Simulator is a standalone system, hence does not support multiple sessions at the same time. DLS does not differentiate between various categories

of users. However there is an option with the user to select a advanced or a simple environment on the click of a button.

3.0 GETTING STARTED

3.1 Starting up
The software can be easily started by clicking on the DLS Icon on the start menu. However the default installation also leaves a shortcut on the desktop. The application can be easily accessed by clicking on the shortcut. As a result a Graphical Interface appears on the screen.

3.2 System Menu
Before the explanation of the functionalities, it is imperative to understand the basic structure of Digital Logic Simulator. Menu Bar is used to perform various functions like file operations, Editing of the schematic, setting of run parameters. Toolbar is a one click repository from various functions can be invoked. Component Toolbar is a repository for various basic gates which can be dragged on to the circuit canvas. Circuit canvas is analogous to the breadboard in digital hardware design.
Various Functionalities of Digital Logic Simulator are explained below:

3.2.1 File Operations
This can be invoked by clicking on the File button on menu toolbar. This functionality can also be invoked using a keyboard shortcut (ALT+F).

Open: This functionality can be invoked by clicking on the Open button, or by using a keyboard shortcut (ctrl+O). This is used for opening the preserved schematic files. On clicking the Open button a windows file select dialog box appears and the file can be opened easily by selecting it. There is also a filter to filter out any other file types. Only those files having the extension .dls can seen from the dialog box.

Save: This functionality can be invoked by clicking on the Save Button, or by using a keyboard shortcut (ctrl+S).This is used for saving the circuit drawn on the canvas as a schematic file. On clicking the Save button , if the user is saving the circuit for the first time, a window file save dialogue box appears and the user is prompted to give the user name and file location to save the drawn circuit otherwise if the user is saving the circuit after making changes to the original file the change circuit is saved by the previous file name with a '.dls' file extention .

Save As: This functionality can be invoked by clicking on the Save As Button. This is used for saving the circuit drawn on the canvas as a schematic file. On clicking the Save As button, a window file Save As dialogue box appears and the user is prompted to give the user name and file location to save the drawn circuit .file is save with a '.dls' extention .

Print: This functionality can be invoked by clicking on the Print button, or by using a keyboard shortcut (ctrl+P). On clicking the Print button, a Print window appears .By clicking the print button on the Print window the circuit can be printed.

Exit: This functionality can be invoked by clicking on the Exit button, or by using a keyboard shortcut (ctrl+E). On clicking the exit button, a window with Exit dialog box appears prompting the user to save the circuit before closing the application .Thus user can exit the application by saving or without saving the circuit.

3.2.2 Edit Operations
This can be invoked by clicking on the Edit button on menu toolbar. This functionality can also be invoked using a keyboard shortcut (ALT+E).

Undo: Provides one step undo of the last action done.

Redo: Provides one step redo of the last action undone.

Delete: To delete a component, delete key on the keyboard can also be used to perform the same action.

Clear canvas: Analogous of removing the components from the bread board. Clears the canvas of all components gates if any.

3.2.3 Run Operations
This can be invoked by clicking on the Run button on menu toolbar. This functionality can also be invoked using a keyboard shortcut (ALT+R).

Start: Starts the simulation of the schematic.
Step: Step by Step, incremental Simulation of the schematic.

Simulation Speed: In Digital Logic Simulator, the Simulation Speed can be easily set, to enable users to comprehend fast changes easily.
 Manual: It refers to the manual excitation of the gates.

Slow: This affects the simulation to run at slow rate.
Moderate: This affects the simulation to run at moderate rate.
Fast: This affects the simulation to run at fast rate.

3.2.4 Tools Operations

This can be invoked by clicking on the Tools button on menu toolbar. This functionality can also be invoked using a keyboard shortcut (ALT+T).

Add to Library: Digital Logic Simulator Provides add to library functionality where a logical schematic can be converted to a function block that can be saved in the component repository. First the Schematic has to be drawn on the circuit canvas with proper inputs and outputs. Clicking on this button leads to conversion of the schematic to a block which is saved to the component repository on the left side.

Load from Library: This is used to retrieve the Schematic from the Logic Block from the repository. Clicking on this button leads to the expanding the selected function block to the corresponding logic schematic.

Set Canvas Size: This is useful when the circuit canvas area falls short to accommodate all components (gates etc) of a given schematic diagram. The canvas size can be shrunk or expanded based on the option selected by user.

Advanced Gates: Besides NOT OR & AND gate, DLS also has a provision for three other gates, XOR NAND NOR, these gates can be activated by checking on the button, and can be used as a basic component.

3.2.5 Help Operations

This can be invoked by clicking on the Help button on menu toolbar. This functionality can also be invoked using a keyboard shortcut (ALT+H).

About: The contents button gives information about the developers and the Solutions Group.

Contents: Opens a new help window, where the online help files can be searched and sought information, can be retrieved.

3.2.6 Toolbar Operations

There is a one click repository functions as the toolbar. Various functions can be invoked just by clicking on the respective symbols.