**SATYADIP NAG**

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**JOB OBJECTIVE**

Seeking middle level assignments in Software Testing / Quality Assurance with an organisation of repute preferably in Kolkata.

**PROFILE SUMMARY**

• A dynamic professional with over 8.9 years of experience in Software Testing and Quality Assurance

• Currently associated with Axsys Technology Pvt. Ltd., Kolkata as a Test Lead

• Experienced in Agile methodology, Test Planning, Test Estimation, Test Status Reporting, Test Case Design and Test Execution

• Well versed in Java Script, HTML, Perl & Shell Scripts and gathered expertise in Mobile Domain, Set Top Box Testing, Web Browser, and MDM.

• Deft in testing methodologies viz. Black Box Testing, Functional Testing, Regression Testing, GUI Testing and Performance Testing

• Acquired knowledge of new methods like Widget Development, technology & industry trends while undertaking various corporate projects

• Acquired knowledge in **Automation skill** using Selenium WebDriver (using Core JAVA), **Ui-Automator and Appium** (using Core JAVA), and **J-Meter** (with bean shell script) and **Android monkey runner** (using Shell script).

• Endowed with excellent analytical ability, logical thinking and communication skills

**CORE COMPETENCIES**

**Software Testing:**

• Performing Test Planning, Tracking of Sprint Task, Designing Test Cases and Handling Manual Test

• Handling activities such as framework development, Automation testing, incremental functional testing, test reporting and issue tracking

**Quality Assurance:**

• Taking stringent quality measures including preparation / maintenance of necessary documents to ensure compliance with ISO 9000:2008 standards & customer requirements

• Performing Quality Assurance on multiple platforms such as Windows, Android, WISE etc.; running on various environments from mobile handsets to Set-Top-Boxes

**WORK EXPERIENCE**

**Jan 2017 to present with Axsys Technology, Kolkata as QA Lead E1**

• setup the CI/CD process and agile methodology.

• Executing sprint planning and tracking for test tasks (Manual Test)

• Analysing test effort estimation for test and manual test scripting

• Performing Incremental Functional Testing(IFT), Test Automation and Test Framework Enhancements

• Handling requirement tracing, defect tracking and sprint wise test status reporting

• Participating in project plan review, functional specification review, risk analysis and internal and external audits

• Setting achievable goals / targets for the team members, conducting performance appraisal’s for the team members & defining growth paths for the team members based on aspirations

**Jun’11 to December, 2016 with AgreeYa Mobility Pvt. Ltd., Pune as a Test Manager**

**Responsibilities:** Interacting with customers and onsite test team regarding requirements and concepts

• Executing sprint planning and tracking for test tasks (Manual Test)

• Analysing test effort estimation for test and manual test scripting

• Performing Incremental Functional Testing(IFT), Test Automation and Test Framework Enhancements

• Handling requirement tracing, defect tracking and sprint wise test status reporting

• Participating in project plan review, functional specification review, risk analysis and internal and external audits

• Setting achievable goals / targets for the team members, conducting performance appraisal’s for the team members & defining growth paths for the team members based on aspirations

**Achievements:**

• Essayed a stellar role in:

• Transferring knowledge among team members and presentation slide

• Carrying out requirement analysis along with team members to increase the requirement understanding and reduce the faults

• Prepared the UI design flow of the application with UI team.

• Acquired knowledge in Automation skill using Selenium WebDriver (using Core JAVA) and Android monkey runner (using Shell script).

• Efficiently developed traceability matrix to avoid requirement missing and prepared both positive and negative test cases and boundary value cases to prevent defects

• Performed cross platform verification to check performance issue

**Mar’10 to Jun’11 with AgreeYa Solutions India Pvt. Ltd., Noida/ Pune as a Test Engineer in Mobility Domain**

**Responsibilities:**

• Managed smooth implementation and testing of the application at client location

• Provided post-implementation, enhancement and maintenance support to client for application

**Achievements:**

• Played a vital role in handling cross platform verification to check performance issue

• Instrumental in developing traceability matrix to avoid requirement missing and preparing both positive and negative test cases and boundary value cases to prevent defects

**PREVIOUS WORK EXPERIENCE**

**Jul’08 to Mar’10 with Azingo Soft Systems India Pvt. Ltd., Pune as a Software Engineer**

**Responsibilities:**

• Executed software development systems in the organization and involved in the design and development of various projects

• Participated in the complete range of project activities, starting from conceptualization, testing to maintenance of the project

• Reviewed the design documents, code changes and project plans

• Maintained the user documents of various projects

**EDUCATION**

• EMBA in Information Technology and Quality assurance from IIBM, Delhi in 2014.

• B.Tech. in Information Technology from MCKV Institute of Technology, Liluah, W.B., affiliated to W.B.U.T. with C.G.P.A. of 7.98/10 in 2008

• XII from Uttarpara Amarendra Vidyapith, Uttarpara, affiliated to W.B.C.H.S.E. with 71.6% marks in 2004

• X from Uttarpara Amarendra Vidyapith, Uttarpara, affiliated to W.B.B.S.E. with 78% marks in 2002

**IT SKILLS**

• Knowledge of Operating Systems/ Platforms such as Windows XP & 7, Linux and Ubuntu

• Well versed in Scripting Languages such as Java Script, HTML, Perl Script & Shell Script

**PERSONAL DETAILS**

Date of Birth: 1st March, 1986

Address: 76/A, S.N.Road, P.O. Bhadrakali, Hooghly-712232, West Bengal

Languages Known: English, Bengali and Hindi

**Please refer to the Annexure given below:**

**ANNEXURE:**

**DOMAIN KNOWLEDGE:**

**TOOLS KNOWLEDGE:**

**• Selenium WebDriver:** WebDriver is the name of the key interface against which tests should be written in Java

**• Eclipse:** Eclipse is an open source community, whose projects are focused on building an open development platform comprised of extensible frameworks, tools and runtimes for building, deploying and managing software across the lifecycle

**• Visual Studio:** Microsoft Visual Studio is an Integrated Development Environment (IDE) from Microsoft. It can be used to develop console and graphical user.

**• Cygwin:** Cygwin is a collection of tools which provide a Linux look and feel environment for Windows

**• Bugzilla:** Bugzilla is a “Bug-Tracking System", allow individual or groups of developers to keep track of outstanding bugs in their product effectively using test case writing in test-topia , creating test run

**• Mantis:** Mantis BT is a free popular web-based bug tracking system. It is written in the PHP scripting language and works with MySQL, MS SQL, and PostgreSQL databases and a web-server.

**• RedMine:** Redmine is a free and open source, web-based project management and bug-tracking tool

**• TFS:** Team Foundation server test tool is a Microsoft product for project management and test management

**• Test Director 8.0:** TestDirector is a test management tool and it is used for requirement management, test design, test execution and defect management

**• SVN:** Subversion is a version control system, manages files and directories, and the changes made to them, over time

**• GDB:** Gdb is a Linux debugger. Engineer can see the internal structure of a program, print out variable values, set breakpoints and single step through source code. It is helpful for fixing the problems in program code.

**• Scratchbox:** Scratchbox is a cross-compilation toolkit designed to make embedded Linux application development easier

**SPECIFICATION KNOWLEDGE:**

**• EDVELOP:** Edevelop is a multipurpose school APP and Web Service. Performed Automation test for web-service, using Selenium web-driver.

**• Environment related to STB:** Worked with various peripherals related to Android based Set-top-box such as HDMI player, HDMI-CVBS passthrough etc to test complete environment related to the STB

**• FUSE File system in User Space:** FUSE is particularly useful for writing virtual file systems. Unlike traditional file systems that essentially save data to and retrieve data from disk, virtual file systems do not actually store data themselves. They act as a view or translation of an existing file system or storage device.

**• File POSIX API:** POSIX is “Portable Operating System Interface” based on Unix

**• Cloud computing:** Cloud computing is a technology that was the internet and central remote servers to maintain data and application can be access by any computer with internet access

**• Browser requirement:** Requirements doc for Virtual Canvas, Platform keyboard, Virtual Cursor, 4-way navigation, HTML5 Audio/Video, HTML5 Geo-location, Canvas, storage, form, all other mobile browser related features’ requirement and Webkit Layout test

**• BONDI specification:** BONDI is all about bringing great web applications and widgets to the mobile device

**• JIL specification:** JIL is a joint venture between Vodafone, Verizon Wireless, China Mobile and Softbank Mobile

**• S60 specification:** S60 is a user interface specification for mobile application, provided by Nokia

**• W3C widget formatting specification:** Widget is a Web 2.0 concept and this specification standardizes a packaging format for software known as Widgets, which are client-side applications that are authored using Web standards, but whose content can also be embedded into Web documents.

**• Security specification (W3C and JIL):** Widget is a Web 2.0 concept that is gaining momentum lately. But, in order to be successful, it must have a sound security scheme. JIL, W3C provide there security specification for authored widget’s development.

**LIST OF PROJECTS UNDERTAKEN:**

**PROJECT UNDERTAKEN – 1 @AgreeYa Mobility**

**Description:** CC certification for Android Devices.

**Client**: Kyocera

**Project**: CC certification

**Period**: Jan’ 16 to December 16

**Role**:QA Lead

**Team Size**: 9

Responsibilities**:**

• Leading the QA team

• Understanding the requirement and discussing with team.

• Analyzing and reviewing overall functional design, overall technical designs and detailed technical design documents for better understanding of the Extensions and Interfaces.

• Developing test plans and test cases based on the available functional specifications, Use Cases and also by considering both positive and negative scenarios

• Review of test cases.

• Performing manual testing

• Performing Automation testing using UI-Automator, J-Meter, and Selenium.

• Setting up of test environment and preparing test data on different machines for the functional and regression testing

• Comparing and analyzing actual results with expected results and reporting all deviations for resolution

• Testing the layout of various peripherals as per design specifications

• Executing the test cases for both functional and GUI testing in the Regression suite

• Testing all the GUI Features

• Revising test scripts as required to meet the new and changing specifications

• Requesting for enhancements and discussing with developers to resolve technical issues

• Cross browser check for functionality and UI.

• Tracking the bug using Redmine and as well as excel.

• Test case update, review and execution.

**PROJECT UNDERTAKEN – 2 @AgreeYa Mobility**

**Description:** Edvelop Web-service Automation.

**Client**: Chennai University

**Project**: Edvelop

**Period**: October’ 15 to Jan’ 16ß

**Role**:QA Lead

**Team Size**: 4

Responsibilities**:**

• Leading the QA team

• Understanding the requirement and discussing with team.

• Analyzing and reviewing overall functional design, overall technical designs and detailed technical design documents for better understanding of the Extensions and Interfaces.

• Developing test plans and test cases based on the available functional specifications, Use Cases and also by considering both positive and negative scenarios

• Review of test cases.

• Performing Automation testing using J-Meter, and Selenium.

• Setting up of test environment and preparing test data on different machines for the functional and regression testing

• Comparing and analyzing actual results with expected results and reporting all deviations for resolution

• Testing the layout of various peripherals as per design specifications

• Executing the test cases for both functional and GUI testing in the Regression suite

• Testing all the GUI Features

• Revising test scripts as required to meet the new and changing specifications

• Requesting for enhancements and discussing with developers to resolve technical issues

• Cross browser check for functionality and UI.

• Publish the test result automatically to the stack-holder.

**PROJECT UNDERTAKEN – 3 @AgreeYa Mobility**

**Description:** HP Lighthouse Project.

**Client**: HP

**Project**: Lighthouse

**Period**: Jun’ 14 to October’ 15

**Role**:QA Lead

**Team Size**: 9

Responsibilities**:**

• Leading the QA team

• Understanding the requirement and discussing with team.

• Analyzing and reviewing overall functional design, overall technical designs and detailed technical design documents for better understanding of the Extensions and Interfaces.

• Developing test plans and test cases based on the available functional specifications, Use Cases and also by considering both positive and negative scenarios

• Review of test cases.

• Performing manual testing

• Performing Automation testing using UI-Automator, J-Meter, and Selenium.

• Setting up of test environment and preparing test data on different machines for the functional and regression testing

• Comparing and analyzing actual results with expected results and reporting all deviations for resolution

• Testing the layout of various peripherals as per design specifications

• Executing the test cases for both functional and GUI testing in the Regression suite

• Testing all the GUI Features

• Revising test scripts as required to meet the new and changing specifications

• Requesting for enhancements and discussing with developers to resolve technical issues

• Cross browser check for functionality and UI.

• Tracking the bug using Redmine and as well as excel.

• Test case update, review and execution.

**PROJECT UNDERTAKEN – 4 @AgreeYa Mobility**

**Description:** Test Web-app or play store for Nokia.

**Client**: Nokia

**Project**: Plum (Nokia web application test.)

**Period**: September’ 13 to June’ 14

**Role**:QA Lead

**Team Size**: 5

Responsibilities**:**

• Leading the QA team

• Understanding the requirement and discussing with team.

• Analyzing and reviewing overall functional design, overall technical designs and detailed technical design documents for better understanding of the Extensions and Interfaces.

• Developing test plans and test cases based on the available functional specifications, Use Cases and also by considering both positive and negative scenarios

• Review of test cases.

• Performing manual testing

• Setting up of test environment and preparing test data on different machines for the functional and regression testing

• Comparing and analyzing actual results with expected results and reporting all deviations for resolution

• Testing the layout of various peripherals as per design specifications

• Executing the test cases for both functional and GUI testing in the Regression suite

• Testing all the GUI Features

• Revising test scripts as required to meet the new and changing specifications

• Requesting for enhancements and discussing with developers to resolve technical issues

• Cross browser check for functionality and UI.

• Tracking the bug using Jira and as well as excel.

• Test case update, review and execution using QC (Quality center).

**PROJECT UNDERTAKEN – 5 @AgreeYa Mobility**

**Description:** Test Android Email, Exchange server, Backup Contact and setup wizard for NCMC-Verizon

**Client**: NCMC-Verizon

**Project**: NEC

**Period**: May’ 13 to September’13

**Role**:QA Lead

**Team Size**: 3

Responsibilities**:**

• Leading the QA team

• Cross checking the behavior in Samsung S4/S3 and Motorola devices on JB(Android 4.2)

• Analyzing and reviewing overall functional design, overall technical designs and detailed technical design documents for better understanding of the Extensions and Interfaces

• Developingtest plans and test cases based on the available functional specifications, Use Cases and also by considering both positive and negative scenarios

• Performing manual testing

• Setting up of test environment and preparing test data on different machines for the functional and regression testing

• Executing test cases developed by self

• Comparing and analyzing actual results with expected results and reporting all deviations for resolution

• Testing the layout of various peripherals as per design specifications

• Executing the test cases for both functional and GUI testing in the Regression suite

• Testing all the GUI Features

• Revising test scripts as required to meet the new and changing specifications

• Requesting for enhancements and discussing with developers to resolve technical issues

**PROJECT UNDERTAKEN – 6 @ AgreeYa Mobility**

**Project Title**: R4G STB

**Description:** Testing for Android based STB environment

**Client**: Marvell

**Period**: Aug’12 to Apr’13

**Role**:QA Lead

**Team Size**: 3

Responsibilities **:**

• Lead the QA team

• Cross checked the R4G STB with Sony Betel Box, Marvel DMP Box & Marvell SDK Board

• Analyzed and reviewed functional overall designs, technical overall designs and technical detailed designs documents for better understanding of the Extensions and Interfaces

• Developed test plan and test cases based on the available functional specifications, Use Cases and also by considering both positive and negative scenarios

• Performed manual testing

• Handled setup of test environment and prepared test data on different machines for functional and regression testing

• Executed and developed test cases

• Compared and analyzed actual to expected results and reported all deviations for resolution

• Tested the layout of various peripherals as per design specifications

• Executed the test cases for both functional and GUI testing in the Regression suite

• Tested all the GUI Features

• Revised test scripts as required to meet new and changing specifications

• Enhancements’ requested and discussed with developers to resolve technical issues

**PROJECT UNDERTAKEN – 7 @ AgreeYa Mobility**

**Title**: VMM – Vcast Media manager (Cloud)

**Description**: Cloud Test case and scenario creation and execution for NEC

**Client**: Verizon - NEC

**Period**: Jan ‘11 to Aug’ 11

**Role**:QA Engineer

**Team Size**: 2

Responsibilities:

• Analyzed and reviewed functional overall design, technical overall designs and technical detailed design documents for better understanding of the Extensions and Interfaces

• Developed test plan and test cases based on the available functional specifications, Use Cases and also by considering both positive and negative scenarios

• Performed manual testing

• Responsibilities included setting up of test environment and preparing test data on different machines for the functional and regression testing

• Executed test cases developed by self

• Compared and analyzed actual to expected results and reported all deviations for resolution

• Involved in testing the layout of various Extension screens as per design specifications

• Executed the test cases for both functional and GUI testing in the Regression suite

• Tested all the GUI Features

• Revised test scripts as required to meet new and changing specifications

• Enhancements’ request and discussed with developers to resolve technical issues

• Handled client call-meetings

**PROJECT UNDERTAKEN – 8 @ AgreeYa Solution**

**Description**: Develop auto build system using Perl and shell script

**Client**: LG Korea

**Role**:Build manager

**Period**: Dec’10 to Jan’11

**Team Size**: 1

Responsibilities**:**

• Set up the build environment with current date and time

• Downloadedthe source code from SVN server

• Built the code with proper build command

• Created binary tar and uploaded to FTP server

• Tested the build binary and certified it

**PROJECT UNDERTAKEN – 9 @AgreeYa Solution**

**Description**: Test case and scenario creation for sCloudFS technology

**Client**: Samsung US

**Project 5 Title**: sCloudFS and Fuse technology testing project

**Duration**: 20 days

**Role**:QA Engineer

**Team Size**: 1

Responsibilities **:**

• Analyzed and reviewed functional overall design, technical overall designs and technical detailed design documents for better understanding of the Extensions and Interfaces

• Developed test plan and test cases based on the available functional specifications, Use Cases and also considered both positive and negative scenarios

• Performed manual testing

• Set-up of test environment and prepared test data on different machines for functional&regression testing

• Compared and analyzed actual to expected results and reported all deviations for resolution

• Involved in testing the layout of various Extension screens as per design specifications

• Executed the test cases for both functional and GUI testing in the Regression suite

• Tested all the GUI Features

• Revised test scripts as required to meet new and changing specifications

• Enhancements’ requested and discussed with developers to resolve technical issues

• Handled client call-meeting

**PROJECT UNDERTAKEN – 10 @AgreeYa Solution**

**Project Description**: Test case and scenario creation for browser app

(Platform keyboard, Virtual Cursor, Virtual Canvas, 4-way navigation, HTML5 Audio/Video and all other Browser features)

**Client**: LGE Korea

**Project**: Wise Browser features implementation and Maintenance for Commercialization (Commercialized ETNA11, Golf, Cougar devices in the Europe, India, and Arab market)

**Tools**: Bugzilla and Mantis Test Manager, Windows XP, Visual Studio, Cygwin

**Period**: Apr’10 to Feb’11

**Role**:QA Engineer

**Team Size**: 1

Responsibilities **:**

• Analyzed and reviewed functional overall design, technical overall designs and technical detailed design documents for better understanding of the Extensions and Interfaces

• Developed test plan and test cases based on the available functional specifications, Use Cases and also by considering both positive and negative scenarios

• Performed manual testing

• Set up test environment and prepared test data on different machines for functional and regression testing

• Executed test cases developed by self

• Compared and analyzed actual to expected results and reported all deviations for resolution

• Involved in testing the layout of various Extension screens as per design specifications

• Executed the test cases for both functional and GUI testing in the Regression suite

• Tested all the GUI Features

• Revised test scripts as required to meet new and changing specifications

• Enhancements’ requested and discussed with developers to resolve technical issues

• Participated in staff meetings and team meetings

**PROJECT UNDERTAKEN – 11 @AgreeYa Solution**

**Description** : Widget development at Android platform

**Duration** : 20 days

**Platform/ environment** : Android& Ubuntu

**Languages** : Java Script, HTML & CSS

**Role** : Widget Developer

**Responsibilities :**

• Developed Widget at android platform as per the requirement

• Performed unit testing, and features testing for developed widgets.

• Incorporate the change request came from management.

**PROJECT UNDERTAKEN – 12 @AgreeYa Solution**

**Description** : W3C widget formatting testing on LG-WISE platform

**Duration** : 15 days

**Platform/ environment** : WISE & Windows

**Languages** : Java Script, HTML & CSS

**Tools** : Bugzilla, Svn & Visual Studio

**Client** : LG

**Role** : QA Engineer and Widget developer

Responsibilities **:**

• Tested cases and scenario creation in Bugzilla according to the W3C specification

• Created the test Plan in Bugzilla

• Developed the widgets according to the W3C Spec

• Debugged the crashing issue/bug(s) using Visual Studio tool

• Maintained the version Id using SVN

**PROJECT UNDERTAKEN – 13 @ AZINGO SOFT SYSTEMS**

**Description** : Bondi WRT API testing on WISE and Azingo LiMo platform.

**Duration** :2 Months

**Platform/ environment** : WISE, LiMo& Ubuntu

**Languages** : Java Script, HTML & CSS

**Tools** : Bugzilla, Svn, GDB & Scratchbox

**Client** : LG

**Role** :QA Engineer and Widget developer

Responsibilities **:**

• Tested cases and scenario creation in Bugzilla according to the Bondi specification

• Created the test Plan in Bugzilla

• API testing using JS and HTML according to the Bondi Specification. Writing automated widget using Java script, HTML and CSS

• Developed the widgets according to the Bondi Spec

• Debugged the crashing issue/bug(s) using GDB Linux debugging tool and other issue/bug(s) using java script print statement

• Maintained the version Id using SVN

**PROJECT UNDERTAKEN – 14 @ AZINGO SOFT SYSTEMS**

**Description** : JIL WRT API testing on Vodafone 360 Platform.

**Duration** : 4 Months

**Platform/ environment** : Vodafone 360, LiMo & Ubuntu

**Languages** : Java Script, HTML &CSS

**Tools** : Bugzilla, Svn, GDB &Scratchbox

**Client** : Vodafone

**Role** : QA Lead

**Responsibilities** :

• Led the project with 3 team members

• Tested cases and scenario creation in Bugzilla according to the JIL specification

• Created the test Plan in Bugzilla

• Performed API testing using JS and HTML according to the JIL Specification

• Wrote automated widget using Java script, HTML and CSS

• Developed the widgets according to the JIL Spec

• Debugged the crashing issue/bug(s) using GDB Linux debugging tool and any other issue/bug(s) using java script print statement

• Maintained the version Id using SVN

**PROJECT UNDERTAKEN – 15 @ AZINGO SOFT SYSTEMS**

**Description** :JIL WRT, Security and Widget formatting API testing on Azingo LiMo platform

**Duration** : 8 Months

**Platform/ environment** : LiMo & Ubuntu

**Languages** : Java Script, HTML & CSS

**Tools** : Test Director 8.0, Apache, Bugzilla, Svn, GDB &Scratch Box

**Client** : JIL (Joint Innovation Lab)

**Role** :QA Lead, Release and Build Manager

**Responsibilities** :

• Lead the project with 5 team members

• Tested cases and scenario creation in Bugzilla according to the JIL specification

• Created the test Plan in Bugzilla

• Tracked the bugs using Test Director 8.0 and interacted with the client

• Performed API testing using JS and HTML according to the JIL Specification.

• Wrote automated widget using Java script, HTML and CSS

• Developed the widgets according to the JIL Spec

• Debugged the crashing issue/bug(s) using GDB Linux debugging tool and any other issue/bug(s) using java script print statement

• Maintained the version Id using SVN

• Built entire Web-Run-time component/development and released it to JIL after creating an emulator flash build

**PROJECT UNDERTAKEN – 16 @ AZINGO SOFT SYSTEMS**

**Description** :S60 WRT API testing on Azingo LiMo platform

**Duration** : 4 Months

**Platform/ environment** : LiMo & Ubuntu

**Languages** : Java Script, HTML &CSS

**Tools** : Test Director 8.0, Apache, Bugzilla, Svn, GDB &Scratch Box

**Role** :QA Engineer

**Responsibilities:**

• Wrote test cases and scenario creation in Bugzilla according to the S60 specification

• Createdthe test Plan in Bugzilla

• Performed API testing using JS and HTML according to the S60 Specification

• Wrote automated widget using Java script, HTML and CSS

• Developed the widgets according to the S60 Spec

• Debugged the crashing issue/bug(s) using GDB Linux debugging tool and any other issue/bug(s) using java script print statement

• Maintained the version Id using SVN

**PROJECT UNDERTAKEN DURING B.TECH.**

**• Title: Enterprise Resource Planning Software for an Automobile Industry**

Description:

• Developed HR Management Division and assembled the different segments into one complete Software Industry under HP invents, using VB.Net

**• Title: Courseware on Deadlock**

Description:

• Developed the design and some of coding of the project and assembled the different segments into one complete Software Industry under HP invents, using Multimedia software (Director, Photoshop & Flash)