

Table Of Contents

SECTION I: REVOLUTION AND DESIGN ENVIRONMENT OF VISUAL BASIC 2005

1. INTRODUCTION TO MICROSOFT VISUAL STUDIO 2005.....	1
HISTORY OF MICROSOFT VISUAL STUDIO.....	1
Visual Studio 97.....	1
Visual Studio 6.0.....	2
Visual Studio .NET (2002).....	2
Visual Studio .NET 2003.....	3
Visual Studio 2005.....	3
Future Versions.....	4
INTRODUCTION TO .NET.....	4
Origin Of .NET.....	5
Goals Based On Which .NET Emerged.....	6
Highly Distributed Applications.....	6
Software Development Simplified.....	7
Better User Interface Over The Web.....	7
Deployment Simplified.....	7
A Variety Of Languages Supported.....	7
An Extendable Platform For The Future.....	7
Future Portability of Compiled Applications.....	8
Structure Of .NET.....	8
Common Language Runtime.....	9
.NET Framework Base Classes.....	9
ASP.NET.....	10
Windows Forms.....	10
PROGRAMMING LANGUAGES OF VISUAL STUDIO 2005.....	10
Visual Basic 2005.....	11
Visual C++ 2005.....	11
Visual C# 2005.....	12
Visual J# 2005.....	12
.NET Framework.....	13
Web Forms.....	14
Windows Forms.....	14
Web Services.....	14
XML Support.....	14
2. INTRODUCTION TO VISUAL BASIC 2005.....	15
HISTORY OF VISUAL BASIC.....	15
Versions Of Visual Basic.....	16
Versions Of Visual Basic .NET.....	17
FEATURES OF VISUAL BASIC 2005.....	18
VISUAL BASIC 6.0 V/S VISUAL BASIC 2005.....	19
Data Types Changes.....	19

Variable Declarations Changes.....	20
Improved Type Safety	20
Arrays	20
Array Bounds.....	20
Fixed Arrays	21
ReDim Statement.....	21
Arithmetic Operators	21
Fixed Length Strings.....	21
Boolean Operators	21
Structures and User-Defined Types	22
New And Nothing Keywords	22
No Support For Set Statement	22
Changes In Procedure Syntax.....	23
C++ Like Procedure Calls	23
ByVal Is Default Argument Type.....	23
Optional Keyword	23
Return Statement	24
Changes In Control Flow Statements	24
ADVANTAGES OF VISUAL BASIC 2005.....	24
Build Robust Windows-Based Applications	24
Resolve Deployment And Versioning Issues Seamlessly.....	24
Create Web Applications With A Zero Learning Curve.....	25
SYSTEM REQUIREMENTS FOR VISUAL BASIC 2005	25
DIFFERENT EDITIONS OF VISUAL BASIC 2005	26
3. THE OUTLOOK OF VISUAL BASIC 2005.....	28
INTRODUCTION TO VISUAL BASIC 2005 - IDE.....	28
Getting Started.....	28
UNDERSTANDING THE VISUAL STUDIO IDE.....	31
Start Page.....	31
The Menu Bar	32
The File Menu	32
The Edit Menu	34
The View Menu	36
The Tools Menu.....	47
The Window Menu.....	49
Working With Windows.....	49
Docking Windows	49
Tabbing Windows.....	50
Floating Windows.....	51
Hiding Window	51
Auto Hiding Window	51
Additional (Dynamic) Menu Bar.....	52
The Project Menu	52
The Build Menu.....	57
The Debug Menu	57
The Class Diagram Menu	60
The Data Menu	62

TABLE OF CONTENTS

4. GETTING STARTED WITH THE IDE.....	66
START PAGE OF IDE	66
SOLUTIONS AND PROJECTS	67
What Is A Solution?	67
What Is A Project?	68
What Are Items?.....	69
CREATING SOLUTIONS AND PROJECTS	69
Creating Solutions	69
Creating A Project	70
Working With Solution Explorer	71
Working With The Properties Window	73
Working With ToolBox.....	79
Naming Conventions.....	85
Designing The Form.....	86
Short Description Of ToolBar	90
SAVING THE PROJECT	91
OPENING THE EXISTING PROJECT.....	93
Using Start Page	93
Using Menu Item.....	95
Using The Toolbar.....	95
USING THE CODE EDITOR.....	96
Adding Event Handlers / Methods	101
RUNNING THE PROJECT	102

SECTION II: VISUAL BASIC 2005 BASICS

5. VARIABLES, ARRAYS AND COLLECTIONS	103
Code Statements In Visual Basic 2005.....	103
Comments.....	103
VARIABLES	104
Data Types.....	105
Boolean Data Type	105
Byte Data Type.....	106
Char Data Type	106
DateTime Data Type	106
Decimal Data Type.....	106
Double Data Type	107
Integer Data Type.....	107
Long Data Type.....	108
Object Data Type.....	108
Short Data Type.....	109
Single Data Type	109
String Data Type	109
User Defined Data Type.....	110
Memory Consumed By Data Types	110

Declaring A Variable.....	111
Initializing Variables.....	112
New Keyword.....	113
Nothing Keyword.....	114
Null Keyword.....	115
Implicit And Explicit Declarations.....	115
VARIABLE SCOPE.....	116
Block Scope.....	117
Procedure Scope.....	118
Module Scope.....	119
Namespace Scope.....	120
ACCESSIBILITY OF A VARIABLE.....	121
Public.....	121
Private.....	121
Friend.....	122
Protected.....	123
Protected Friend.....	123
STRUCTURES.....	124
CONVERSION BETWEEN VALUES OF DIFFERENT DATA TYPES.....	128
Widening And Narrowing Conversions.....	129
Widening Conversions.....	129
Narrowing Conversions.....	129
Implicit And Explicit Conversions.....	130
CType Keyword.....	132
Value Changes During Conversions.....	133
Changes During Narrowing And Widening Conversions.....	133
Changes During Reference Type Conversions.....	133
Conversions Between Strings And Other Types.....	133
Conversion Of Numbers To Strings.....	134
Conversion Of Strings To Numbers.....	134
Typeless Programming.....	134
Type Checking.....	135
Object As The Universal Data Type.....	135
Changing Data Type.....	136
Object As An Alternative To A Structure.....	136
Efficient Use Of Data Types.....	137
CONSTANTS.....	137
ARRAYS.....	139
Declaring Arrays.....	139
Initializing Array Variables.....	142
Array Size Limits.....	142
Multidimensional Arrays.....	143
Dynamic Arrays.....	145
Resizing An Array.....	146
The Erase Statement.....	148
Array Class Methods.....	149
GetUpperBound Method.....	149

TABLE OF CONTENTS

GetLowerBound Method.....	150
GetLength Method	151
SetValue Method.....	152
Array.Sort Method.....	153
Arrays Of Arrays	155
ARRAYLIST	156
Using An ArrayList	157
Adding Items To The ArrayList	158
Removing Items From The ArrayList	158
The Item Property.....	160
COLLECTIONS.....	160
Creating Collections	161
Zero-Based and One-Based Collections.....	162
Arrays V/s Collections	162
Adding Items To A Collection	163
Deleting Items From A Collection	166
Retrieving Items From A Collection	167
Collection Types.....	168
Hashtable.....	169
SortedList	171
Queue (First In First Out i.e. FIFO).....	173
Stack (Last In First Out i.e. LIFO)	175
Counting Items In A Collection	176
6. OPERATORS AND CONDITIONAL STATEMENTS	178
OPERATORS.....	178
Arithmetic Operators	179
The ^ Operator.....	179
The * Operator.....	180
The / Operator	180
The \ Operator	181
The Mod Operator	182
The + Operator	183
The – Operator.....	186
Assignment Operators	186
The = Operator	187
The ^= Operator	188
The *= Operator	188
The /= Operator	189
The \= Operator	190
The += Operator	191
The -= Operator	192
The <<= Operator.....	192
The >>= Operator.....	193
The &= Operator	194
The Bit Shift Operators	195
The << Operator	195

The >> Operator	196
The Comparison Operators	198
The Is Operator	199
The Like Operator.....	200
The Concatenation Operators	203
The Logical / Bitwise Operators	204
The AND Operator	204
The NOT Operator.....	205
The OR Operator	206
The XOR Operator	207
The AndAlso Operator	208
The OrElse Operator.....	209
Operator Precedence.....	210
CONDITIONAL STATEMENTS	212
Decision Statements.....	212
The If...Then...Else Statement	213
The Select Case Statement.....	215
The Try...Catch...Finally Statements	216
Loop Statements	218
The While...End While Statement	218
The Do...Loop Statement.....	220
The For...Next Statement.....	222
The For Each...Next Statement.....	224
The With...End With Statement.....	225
Nested Conditional Statements.....	226
7. PROCEDURES AND FUNCTIONS.....	227
PROCEDURES	229
Scope Or Accessibility Of Procedures.....	230
Sub Procedures	231
Sub Main Procedure	233
Event Handling Procedures	233
Arguments	235
Passing Arguments By Value	235
Passing Arguments By Reference.....	236
Passing Arguments By Position And By Name.....	237
Passing Arguments By Position.....	237
Passing Arguments By Name	237
Mixing Arguments By Position And By Name	237
Optional Arguments.....	238
Parameter Arrays	239
Recursive Sub Procedures	240
Overloading Sub Procedures	241
Functions	242
Properties	245
Arguments	247
Passing Arguments By Value	248

TABLE OF CONTENTS

Passing Arguments By Reference	248
Passing Arguments By Position And By Name	249
Passing Arguments By Position	250
Passing Arguments By Name	250
Mixing Arguments By Position And By Name	250
Optional Arguments	250
Parameter Arrays	251
Recursive Functions	252
Overloading Functions	254
HANDS ON EXERCISES	255
8. CONSTRUCTING A USER INTERFACE USING WINDOWS FORMS	257
USER INTERFACE	257
Forms	257
Properties	258
WINDOWS FORMS	258
THE SYSTEM.WINDOWS.FORMS NAMESPACE	259
CREATING A USER INTERFACE USING WINDOWS FORMS	260
Creating The Form	260
Changing The File Name	261
Changing The Form Title	262
Changing The Form Name	262
Saving The Project	263
Adding A TextBox Control	263
Name The Text Box Control	265
Adding The Code Spec	266
Running The Program	267
INTERACTING WITH FORMS	268
Form Controls	268
Common Properties	268
Common Events	280
Controls	282
Button Control	282
CheckBox Control	286
ComboBox Control	290
DateTimePicker Control	298
Label Control	304
LinkLabel Control	304
ListBox Control	309
MaskedTextBox Control	314
NumericUpDown Control	322
PictureBox Control	325
RadioButton Control	328
RichTextBox Control	332
TextBox Control	337
WebBrowser Control	342
GroupBox Control	345

TabControl Control.....	347
DataGridView Control.....	349
Dialog Boxes	353
ColorDialog Control	353
FontDialog Control.....	355
OpenFileDialog Control	357
SaveFileDialog Control	361
BUILDING AN EDITOR.....	365
Form Specifications.....	366
Creating The Form.....	367
Adding Form Controls As Per Form Specifications	369
Adding Code Spec	369
Running The Program.....	376
HANDS ON EXERCISES	377
9. MDI APPLICATIONS AND MENUS.....	380
MDI APPLICATIONS	380
Creating MDI Application	381
Creating The MDI Parent Window.....	381
Creating MDI Child Window	381
MENUS	384
Types Of Menus	385
Main Menu	385
The MenuStrip Class	387
Adding MenuStrip Control	387
Adding Menu Items And Sub Menu Items To The MenuStrip.....	389
Adding A Separator To The Menu Items	392
Adding Access Keys To The Menu Items	393
Adding A Shortcut Key To The Menu Items.....	395
Adding Images To The Menu Items	397
Items Collection Editor.....	399
Adding Code To Menu Items	400
Context Menu	405
Adding ContextMenuStrip Control.....	406
Adding Menu Items And Sub Menu Items To The ContextMenuStrip	408
Adding A Separator To Context Menu Items	409
Adding Access Keys To Context Menu Items.....	410
Adding A Shortcut Key To Context Menu Items	411
Adding Images To Context Menu Items.....	413
Items Collection Editor.....	414
Adding Code To Context Menu Items.....	415
HANDS ON EXERCISE.....	416
10. WORKING WITH DATABASES USING ADO.NET.....	417
EVOLUTION OF ADO.NET	417
ADO.NET.....	417

TABLE OF CONTENTS

THE ADO.NET OVERVIEW.....	418
.NET Data Providers	419
GETTING STARTED WITH ADO.NET OBJECTS	420
Namespaces	420
Connections.....	421
Commands.....	423
DataReader	426
DataAdapter	430
DataSets.....	432
CommandBuilder	435
AN EMPLOYEE MASTER FORM	442
DATAGRIDVIEW WITH ADO.NET	467
HANDS ON EXERCISE	478
SOLUTIONS TO HANDS ON EXERCISES	481
SECTION III: OBJECT ORIENTED PROGRAMMING	
11. INTRODUCTION TO OBJECT ORIENTED PROGRAMMING	497
Abstraction	498
Encapsulation	498
Inheritance.....	500
Polymorphism	502
OBJECT	504
Object Composition.....	504
Working With Objects.....	504
Declaring And Instantiating An Object.....	504
Object References.....	508
De-Referencing Objects	508
CLASS	509
Class Members	510
Access Keywords	512
Creating A Class.....	513
Properties.....	518
Read-Only Properties	521
Write-Only Properties	521
Constructor Methods.....	522
Parameterized Constructors.....	522
Optional Parameters	524
Method Overloading.....	525
Inheritance	526
CREATING A CLASS LIBRARY USING VISUAL BASIC 2005.....	530
Building The Class Library	537
Importing The Build Class	537

12. OBJECT ORIENTED PROGRAMMING WITH ACCESS DB	541
CREATING A LIBRARY	541
CREATING A CLIENT	552
Form Specifications	553
SECTION IV: ADVANCED VISUAL BASIC 2005	
13. EXCEPTIONS AND ERROR HANDLING	563
TYPES OF ERRORS	563
Syntax Error	564
Runtime Error	567
Trapping Runtime Errors	569
The Try Block	569
The Catch Block	569
The Finally Block	569
Logic Error	575
DEBUGGING IN VISUAL BASIC 2005	578
The Debug Menu	579
The Watch Window	583
The Output Window	587
The Breakpoints Window	587
The Autos Window	588
The Locals Window	589
The Call Stack Window	590
The Immediate Window	591
14. DEALING WITH FILES AND DIRECTORIES	593
FILE AND DIRECTORY	593
PROCESSING FILES	593
The Stream Class	594
FileStream Class	595
StreamReader And StreamWriter Class	597
BinaryReader And BinaryWriter Class	601
DEVELOPING A NOTEPAD TYPE EDITOR	607
15. DEALING WITH XML	612
AN INTRODUCTION TO XML	612
WHAT XML DOES	613
XML Can Be Used To Exchange Data	613
XML Can Be Used To Share Data	613
XML Can Be Used To Store Data	613
XML Can Make Data More Useful	613
XML Can Be Used To Create New Languages	613
XML Can Be Used To Reduce Incompatibilities	614

TABLE OF CONTENTS

USING XML WITH ADO.NET	617
Saving Data To XML File	618
Form Specifications	618
Table Specifications	619
Adding The Code Spec	619
Run The Application	621
Loading Data From XML File	625
Form Specifications (Only Modifications)	625
Adding The Code Spec	625
Run The Application	626
Creating XML Schema	628
Generating A XML Schema	629
Form Specifications (Only Modifications)	629
Run The Application	630
The XML Schema File	631
Validating The XML Document Using XML Schema	633
Run The Application	634
DATA EXPORTER FROM ACCESS DB TABLE TO MYSQL DB TABLE	635
XML NAMESPACES AND CLASSES	642
Retrieving XML Document's Properties	645
Retrieving NodeType Information	646
Writing XML Documents	649
Using XmlDocument To Write XML Documents	651
16. WINDOWS USER CONTROLS	652
CREATING A DATA BOUND COMBOBOX	652
Creating A Windows Control Library	653
Adding The Code Spec	655
Creating A Client Application	659
CREATING A LOGIN FORM AS A USER CONTROL	664
Form Specifications	664
Creating A Windows Control Library	665
Adding Code Spec	665
Creating A Client Application	670
Using The State Property	673
DECLARING AND RAISING EVENTS	675
HANDS ON EXERCISE	679
17. INTRODUCTION TO SETUP AND DEPLOYMENT	682
THE SETUP WIZARD	682
DEPLOYING THE PMS APPLICATION	699
SOLUTIONS TO HANDS ON EXERCISES	706

SECTION V: PROJECT MANAGEMENT SYSTEM

18. PROJECT MANAGEMENT SYSTEM TABLE DEFINITIONS 714

PROJECT SCOPE 714

TABLE DEFINITIONS FOR THE PROJECT MANAGEMENT SYSTEM 715

 ProjectMaster 715

 ProjectDetails 716

 ModuleDetails 716

 TaskMaster 717

 TypeMaster 718

 CheckListMaster 718

 TaskTypeMaster 719

 AuditMaster 719

 ErrorMaster 720

 EmployeeMaster 721

 EmployeeDetails 721

 AddressMaster 722

 QualificationMaster 723

 EmployeeMuster 724

 ProjectMembers 724

 CheckListDetails 725

THE ENTITY RELATIONSHIP DIAGRAM 726

19. PROJECT MANAGEMENT SYSTEM USER MANUAL 727

THE PROJECT MANAGEMENT SYSTEM 727

REQUIREMENTS 730

GETTING STARTED 730

 The Entry Point 730

 The Data Entry Forms Of The Application 731

 Employee Master 731

 Purpose 731

 Accessed Using 731

 Adding A New Employee 731

 Modifying An Existing Employee Details 736

 Deleting An Existing Employee 737

 Canceling Data Entry 739

 Project Type Master 739

 Purpose 739

 Accessed using 739

 Adding A New Project Type 739

 Modifying An Existing Project Type 742

 Deleting An Existing Project Type 743

 Canceling Data Entry 744

 Check List Master 744

 Purpose 744

 Accessed using 744

 Adding A New Check List 744

TABLE OF CONTENTS

Modifying An Existing Check List	746
Deleting An Existing Check List.....	747
Canceling Data Entry	748
Task Type Master	748
Purpose	748
Accessed using	748
Adding A New Task	749
Modifying An Existing Task	751
Deleting An Existing Task	752
Canceling Data Entry	753
Project Master	753
Purpose	753
Accessed using	754
Adding A New Project Details	754
Modifying An Existing Project Details	762
Deleting An Existing Project.....	765
Canceling Data Entry	767
Project Management.....	767
Purpose	767
Accessed using	767
Defining A Task	768
Submitting Completed Task	770
Submitting A Task For Auditing	771
Returning An Audited Task.....	772
Completed Tasks	774
Solving Errors Pointed Out	775
Task Available For Re-Auditing	776
Duplicate Task Definition	776
Deleting A Task.....	777
Deleting A Task Submitted For Auditing.....	777
Employee Muster	778
Purpose	778
Accessed using	778
Adding A New Muster Record.....	779
Modifying A Muster Record	780
Deleting A Check List.....	781
Canceling Data Entry	782
20. PROJECT MANAGEMENT SYSTEM LIBRARY MODULE.....	783
getConnection.....	783
clearGrid.....	784
fillGrid.....	784
getNextID	785
clearForm	786
formToGrid	787
checkForDelete.....	788
transferGridToDb	788

doOperation	790
hideColumns	791
changeColor	791
checkBlank	792
checkRelatedTables	792
fillCombo	793
getIdFromCombo	794
getNameFromCombo	795
changeTextColor	795
21. PROJECT MANAGEMENT SYSTEM MASTER DATA ENTRY FORMS.....	796
CHECK LIST MASTER	796
Data Entry Form Specifications	796
Data Entry Form Fields Validation Rules	796
Micro-Help For Form Fields	797
Form Layout For Check List Master	797
The Pseudo Flow Of The Form Code Spec	797
When The Form Loads	798
Viewing Form Data	800
Inserting Form Data	800
Updating Form Data	802
Deleting Form Data	803
Canceling Data Entry	804
Submitting Form Data	805
PROJECT TYPE MASTER	807
Data Entry Form Specifications	807
Data Entry Form Fields Validation Rules	807
Micro-Help For Form Fields	807
Form Layout For Project Type Master	808
The Pseudo Flow Of The Form Code Spec	808
When The Form Loads	809
Viewing Form Data	810
Inserting Form Data	810
Updating Form Data	812
Deleting Form Data	813
Canceling Data Entry	814
Submitting Form Data	815
TASK TYPE MASTER	816
Data Entry Form Specifications	816
Data Entry Form Fields Validation Rules	816
Micro-Help For Form Fields	816
Form Layout For Task Type Master	817
The Pseudo Flow Of The Form Code Spec	817
When The Form Loads	818
Viewing Form Data	819
Inserting Form Data	820
Updating Form Data	821

TABLE OF CONTENTS

Deleting Form Data	822
Canceling Data Entry	823
Submitting Form Data	824
EMPLOYEE MASTER	826
Data Entry Form Specifications	826
Data Entry Form Fields Validation Rules	826
Micro-Help For Form Fields	827
Form Layout For EmployeeMaster	828
The Pseudo Flow Of The Form Code Spec	830
When The Form Loads	830
Viewing Form Data	832
Inserting Form Data	838
Updating Form Data	844
Deleting Form Data	848
Canceling Data Entry	850
Submitting Form Data	850
22. PROJECT MANAGEMENT SYSTEM MASTER/DETAIL DATA ENTRY FORMS	854
EMPLOYEE MUSTER	854
Data Entry Form Specifications	854
Data Entry Form Fields Validation Rules	854
Micro-Help For Form Fields	855
Form Layout For Employee Muster	855
The Pseudo Flow Of Form Code Spec	856
When The Form Loads	856
Viewing Form Data	858
Inserting Form Data	860
Updating Form Data	861
Deleting Form Data	863
Canceling Data Entry	863
Submitting Form Data	864
PROJECT MASTER	865
Data Entry Form Specifications	865
Data Entry Form Fields Validation Rules	865
Micro-Help For Form Fields	866
Form Layout For Project Master	867
The Pseudo Flow Of Form Code Spec	870
When The Form Loads	870
Viewing Form Data	873
Inserting Form Data	884
Updating Form Data	893
Deleting Form Data	902
Canceling Data Entry	907
Submitting Form Data	908
PROJECT MANAGEMENT	912
Data Entry Form Specifications	912
Data Entry Form Fields Validation Rules	912

Micro-Help For Form	913
Form Layout For Project Management.....	914
The Pseudo Flow Of The Form Code Spec	916
When The Form Loads	917
Viewing Form Data	923
Inserting Form Data	939
Updating Form Data	945
Deleting Form Data	948
Canceling Data Entry.....	951

SECTION VI: APPENDIX

A. UPGRADING APPLICATIONS FROM VISUAL BASIC 6.0 TO VISUAL BASIC 2005..... 953

GENERAL REQUIREMENTS FOR AN UPGRADE.....	954
THE UPGRADE WIZARD.....	954
Starting The Upgrade Wizard.....	955
Fixing The Warnings	962
Running The Application	967

B. WORKING WITH MYSQL USING MYSQL CONNECTOR/NET 969

INTRODUCTION.....	969
INSTALLING MYSQL	970
Starting The MySQL Command Line Client On Windows.....	981
CONNECTOR/NET.....	982
Installing Connector/NET.....	982
AN EMPLOYEE MASTER FORM.....	984
Adding A Reference To MySql.Data.dll	987
Importing MySql.Data.MySqlClient Namespace	989
Adding The Code Spec	989

C. CRYSTAL REPORTS 1001

INTRODUCTION.....	1001
CREATING AN EMPLOYEE REPORT	1002

D. USING A VB USER CONTROL IN OTHER CLR COMPLIANT LANGUAGES..... 1020

EMBEDDING THE LOGIN CONTROL IN C#.....	1020
EMBEDDING THE LOGIN CONTROL IN J#.....	1026
EMBEDDING THE LOGIN CONTROL IN C++	1028

E. BUILT-IN FUNCTIONS..... 1031

Application Enhancement Functions	1031
The MessageBox Or MsgBox Function	1032
InputDialog Function.....	1035
Console.WriteLine Function.....	1037
String Functions.....	1038
Comparing Strings	1038

TABLE OF CONTENTS

Reversing A String	1039
Searching For A String	1039
Extracting Part Of String	1040
Uppercase And Lowercase Of A String	1041
Trimming Spaces And Characters From A String	1042
Finding The Length Of A String	1043
Replacing String	1044
Padding Strings	1045
Concatenating Strings	1045
Copying Strings	1046
Adding Strings	1046
Removing Strings	1047
Concatenating An Array Of Strings	1047
Splitting Strings	1048
Quick Manipulation Of Strings With StringBuilder	1048
Appending String	1048
Inserting String	1049
Replacing String	1049
Removing A Substring	1049
Finding The Index Of A String	1049
Splitting String	1050
Comparing Strings	1051
Date Functions	1051
Getting Current Date / Time	1054
Now() Function	1054
Today() Function	1054
TimeOfDay() Function	1055
Performing Date Calculations	1055
DateAdd() Function	1055
DateDiff() Function	1058
DatePart() Function	1060
Returning Date	1062
DateSerial() Function	1062
DateValue() Function	1064
MonthName() Function	1065
WeekdayName() Function	1065
Returning Time	1066
TimeSerial() Function	1066
TimeValue() Function	1067
Setting The Date And Time	1068
DateString() Function	1068
TimeString() Function	1068
Formatting Date and Time	1069
Math Functions	1072
Absolute Value	1072
Square Root Value	1072
Rounding Off A Value	1073

Number Signs Value.....	1073
Logarithmic Value.....	1074
Exponential Value.....	1074
Trigonometric Value.....	1074
Random Value.....	1075
F. REGULAR EXPRESSIONS.....	1076
Regular Expressions Or The Regex Class.....	1077
Character Escapes.....	1079
Character Classes.....	1080
Atomic Zero-Width Assertions.....	1080
Quantifiers.....	1081
Grouping And Alternating Constructs.....	1083
Backreferences.....	1086
Backtracking.....	1087
Regular Expressions Examples.....	1088
Validating Email.....	1088
Parsing Dates.....	1088