

Cicode Programming Exam Study Guide

Version 7.0

Citect Pty Ltd

3 Fitzsimons Lane
GORDON NSW 2072

PO Box 174
PYMBLE NSW 2073
AUSTRALIA

Telephone: 61 2 9496 7300
Fax: 61 2 9496 7399

The logo for Citect, featuring the word "Citect" in a bold, black, sans-serif font. The letter 'C' is stylized with a white diagonal slash through it.

DISCLAIMER

Citect Pty Ltd makes no representations or warranties with respect to this manual and, to the maximum extent permitted by law, expressly limits its liability for breach of any warranty that may be implied to the replacement of this manual with another. Furthermore, Citect Pty Ltd reserves the right to revise this publication at any time without incurring an obligation to notify any person of the revision.

Citect Pty Ltd ABN 88 001 158 854 (“Citect”)

Cicode Exam Study Guide Training Manual

INTRODUCTION AND LEGAL NOTICE

Your purchase of this official CitectSCADA Configuration Training Manual entitles you to undertake the CitectSCADA Configuration training course. The number allocated to you on purchase of this manual is your key to complete the course evaluation.

Satisfactory completion of this evaluation is mandatory for you to obtain a Citect certificate of completion of the training course.

The contents of this manual are proprietary to Citect Pty Ltd and all rights, including copyright, are reserved by Citect Pty Ltd. You must not copy any part of the manual in hard or electronic form or make any adaptation or other commercial use of it without Citect's prior written consent.

Citect Pty Ltd will not accept any liability for action taken in reliance on this training manual.

COPYRIGHT

© Copyright Citect Pty Ltd All rights reserved.

TRADEMARKS

Citect Pty Ltd has made every effort to supply trademark information about company names, products and services mentioned in this manual. Trademarks shown below were derived from various sources.

CitectSCADA, CitectHMI, CitectFacilities, CitectSCADA Reports and Ampla are registered trademarks of Citect Pty Ltd

Windows, Windows NT, Windows 2000, Windows XP, MSSQL Server and Excel are trademarks of Microsoft Corporation.

Oracle is a registered trademark of Oracle Corporation and/or its affiliates.

Novell and NetWare are registered trademarks of Novell Inc.

dBASE is a trademark of Borland Inc.

General Notice:

Some product names used in this manual are used for identification purposes only and may be trademarks of their respective companies.

About Us

Members of Citect's team of Instructional Designers have tertiary qualifications in Education, Educational Course Development and are also experienced trainers in their own right; some are also published authors. Currently, the team is supporting a range of over 70 courses in multiple languages and multiple software environments.

Authors

Alynda Brown, David Heath

Contents

CHAPTER 1:	INTRODUCTION TO THE EXAMINATION SYSTEM	1-1
	Overview	1-1
	The Examination Process	1-2
	The Examination System	1-4
	Logging in to the Exam System	1-5
	Exam Questions	1-6
	Commencing an Exam	1-8
	Working through the Exam	1-9
	Completing the Exam	1-10
CHAPTER 2:	CICODE PROGRAMMING EXAM TOPICS	2-1
	Overview	2-1
	Introduction to Cicode	2-2
	Variables	2-3
	Functions	2-4
	Conditional Executors	2-5
	Kernel and Debugging	2-6
CHAPTER 3:	NAVIGATING THE KNOWLEDGE BASE	3-1
	Overview	3-1
	Searching	3-2

Chapter 1: Introduction to the Examination System

Overview

Introduction

There are not many people who enjoy taking exams. In fact most people view impending exams with some degree of trepidation. There are, however, three things that help alleviate anxiety – preparation, preparation and preparation.

This Study Guide is designed to help prepare you for the exams in the Citect Certified SCADA Engineer stream. In this study guide you will see a list of suggested exercises, and a list of references for suggested reading.

The CCSE exams cover a very broad range of topics, so to enhance your chances of passing the exams it is advisable to take enough time to study the topics with which you are not yet familiar.

The best resource is the Citect Educational Services Training courseware. Each of the exams is designed around the content in the Citect curriculum.

Of course you also need to be familiar with searching the Citect Help files and searching the Citect Knowledge base.

This Chapter Covers These Topics:

- The Examination Process 1-2
- The Examination System..... 1-4
- Logging in to the Exam System 1-5
- Exam Questions..... 1-6
- Commencing an Exam 1-8
- Working through the Exam 1-9
- Completing the Exam 1-10

The Examination Process

Citect Authorised Examination Centres

Citect has authorised selected offices throughout the world as Citect Authorised Examination Centres. These centres are most likely to be your local Citect Office or distributor. A list of Examination Centres is located on the Citect website.

<http://www.citect.com/exams/centers>

We are currently in the process of authorising our Citect offices so many of the Citect offices are in provisional status. If you do not find your local office listed on this page contact them directly as they may be a Provisional Examination Centre.

Registering for Your Exam

Before you may sit for any of the Exams in the Citect Certified SCADA Engineer program you must register. This may be done in two ways:

- Contact your local Citect office

or

- Register via the website

To register through the website open this page on the Citect website and fill out your details. When you submit your request an email will be sent to the Exam Coordinator in the region that you have specified. The Exam Coordinator will contact you regarding the details of your exam.

<http://www.citect.com/exams/register>

Exam Registration

Please complete this form to register your interest in sitting one of our exams.

Exam Preference

Select the exam you want to sit:
Please select one.

- CCSE V7 Upgrade
- CitectSCADA Configuration
- Cicode Fundamentals
- Networking and Architecture
- Customisation and Design

Authorised Examination Centre:
Where you would like to sit the exam.

- please select -

Preferred Date:

1 Jan 2005

The Examination Process (cont.)

Why Register?

The registration process not only allows your local office to coordinate exams but is the first step in the exam process. When you register for the first time the Exam Coordinator in your region will arrange for your unique **Student Login** and **Student Password**. The Student Login and Password that you receive will be used in all of your Citect Exams. We will need an email address so that your exam results may be sent to you.

The **Student Login** follows this format

```
exam_joe_student
```

The **Student Password** is a computer generated random selection of characters.

The password will generally not be revealed to you, instead the examination supervisor will log in on your behalf.

Exam Enrolment

Your exam enrolment is created prior to the day of the exam. When the Exam coordinator registers you to sit for a particular exam your Username is entered into the Enrolled User Group for that exam. The enrolment is disabled until the day of your exam.

The Day of the Exam

The Exams are supervised by Exam Coordinators. You may be sitting for your exam at the end of a training course or you may be sitting the exam independently of any courses. When you arrive at the Examination Centre you will need to identify yourself to the Exam Coordinator. If this is your first exam the Exam Coordinator will supply you with your Exam Username and Password. You will then be escorted to the Examination Room. The location of the testing room is most likely to be a Citect Training Room.

The Examination System

Open Book Exams

All exams are open book with some limits as described below. The computers in the Examination room are loaded with an appropriate version of CitectSCADA for the exam being undertaken, the Knowledge Base and all PDF documents available on the distribution CD-ROM or DVD-ROM. You are NOT permitted to take the Citect Educational Services Training Manuals into the examination room, neither are you permitted to bring any other material, including this Study Guide, into the Examination Room.

The exams are supervised by the Exam Supervisor. Whilst you are allowed to refer to the on-line documentation and to create test projects on the installed CitectSCADA system, no speaking is allowed and peeking at someone else's computer is also prohibited.

Blank paper for writing notes will be supplied; any used sheets will be destroyed by the Exam Supervisor.

Time Limit

All Citect certification exams allow a certain maximum amount of time in which to complete your work.

The available time is fixed for each exam and is also subdivided into allotments for each section of the exam. You cannot "bank" time - at the end of a section, any spare time is lost, neither can you back-track once a section is completed.

The available time for the current section is indicated on the exam by an onscreen counter/clock in the top right hand corner of the screen, so you can check the time remaining whenever you like.

Passing Grade

The passing mark for all exams is 75%.

Once you pass all exams (or the upgrade exam if you are an existing CCSE), the CCSE Administrator will be automatically advised. Your certificate will be mailed within a few days.

Logging in to the Exam System

Web Based Exams

All Citect Certified Exams are web based. Before you start your exam, the Exam Coordinator will have Internet Explorer loaded at the Citect Exam web page.

For CitectSCADA V6.x exams, the Exam PC will be required to have the Adobe Flash player installed. This is not necessary for v7 exams as all Flash animations have been removed from the new exams.

Logging In

The Examination system is hosted on the Citect UniverCITe website and can be accessed from a web browser as follows:

- External to the Citect WAN:

`learning.citect.com`

- Within the Citect WAN: a URL shortcut will gain access:

`learning`



Following login, you will see a list of the exams in which you are currently enrolled.

You are enrolled in the following courses

CitectSCADA Configuration v7.0 Examination The CitectSCADA Configuration Examination has been designed to test your knowledge of CitectSCADA.	No Grade
Customization and Design v6.10 Examination The Customization and Design v6.10 Examination has been designed to test your knowledge of CitectSCADA.	No Grade
Networking and Architecture v6.10 Examination The Networking and Architecture Examination has been designed to test your knowledge of CitectSCADA.	No Grade

Exam Questions

Single Answer

Read the question and select your response from the list of options. Select the radio button beside your choice.

1. How many people live on the moon?

Select the correct answer

- A. 0
B. 1
C. 50
D. 100
-

True or False Response

These questions offer a simple choice between two responses. Occasionally, they will also be expressed as a choice between two specific possibilities.

4. Jupiter is the largest planet in our solar system.

Select True or False

- True False
-

Multiple Answers

These questions are expecting at least one response, possibly as many as four. Tick boxes are provided for you to choose as many or as few responses as you think appropriate.

In order to score the marks for these questions, you must choose **exactly** the correct set of responses; there are no partial marks for partially correct responses.

2. Which planets in our solar system have no moons?

Select all that apply

- A. Venus
B. Jupiter
C. Mercury
D. Pluto
-

Typed Responses

A small number of questions expect a typed response.

5. **Type the correct answer in the space provided**

The planet is closest to the sun.

Exam Questions (cont.)

Drag and Drop

These questions only exist in the v6.x exams. the candidate is expected to drag the buttons in the left column onto the responses on the right column. Click the submit button when done.

Saturn	Fourth from the sun
Jupiter	Has the strongest winds
Venus	Closest planet to the earth
Neptune	Discovered in 1781
Uranus	The largest planet
Mars	Has a surface temperature of -230
Pluto	Has over 30 moons

Commencing an Exam

Select Your Exam

From the list of enrolled exams (typically, you will be enrolled in all exams when you register), choose the exam you wish to attempt.

You are enrolled in the following courses

CitectSCADA Configuration v7.0 Examination The CitectSCADA Configuration Examination has been designed to test your knowledge of CitectSCADA.	No Grade
Customization and Design v6.10 Examination The Customization and Design v6.10 Examination has been designed to test your knowledge of CitectSCADA.	No Grade
Networking and Architecture v6.10 Examination The Networking and Architecture Examination has been designed to test your knowledge of CitectSCADA.	No Grade

Personal Details

Once you open your exam, you're requested to confirm all contact details. This includes the name of your supervisor. This person may be contacted at some later time to confirm the exam took place correctly.

Pressing Submit will open the actual exam.

CitectSCADA Configuration v7.0 Examination - Session 1

[<-- Previous](#) [Next -->](#)

Your Examination Details

Please fill in your details below:
NB: This won't contribute to your course grade.

(Question 1 To 3 of 3)

1. Your name:

First name, Last name:

2. Name of your examiner:

First name, Last name:

3. Your address:

Number and Street: City: State: Country: Zip code:

[<-- Previous](#) [Next -->](#)

Working through the Exam

Exam Sections

Having confirmed your details, you are then presented with the exam sections you will encounter. Each of these sections is separately timed and questions in each section, although having equal value, may have different value to questions in other sections.

Typically, there are easy questions worth few marks and hard questions worth more marks. This is your last opportunity to decide you're attempting the wrong exam!

Examination Sections

This Examination is divided into sections. Each section has its own "Start" button, timer and "Submit" button.

To begin each section click the "Start" button. This will take you to questions for that section. (**Do not** click "Next" to start a section as this will take you to the beginning of the next section.)

Answer all questions in the section then click the "Submit" button when you are sure of your answers. Once you have clicked "Submit" your answers **cannot** be changed.

Section 1: The Citect Environment
Section 2A: Managing projects
Section 2B: Managing projects
Section 3A: Setting Up Communications
Section 3B: Setting Up Communications
Section 4A: Graphics
Section 4B: Graphics
Section 5: Commands and Controls
Section 6: Genies and Super Genies
Section 7: Devices
Section 8: Events
Section 9A: Alarms
Section 9B: Alarms
Section 10: Trends
Section 11: Process Analyst
Section 12: Navigation
Section 13: Reports
Section 14: Security

Once you click the **Start** button (not shown in the graphic) timing commences for the first section.

Inside a section

You will be given the name of the section and advised the value of each section and the total number of marks available in the section. The timer in the top-right corner of the screen commences a count-down.

Click submit at the bottom of the screen to complete the section. You will be warned if there are un-completed questions and the section will not close.

Section 1: The Citect Environment

Answer all questions in this section then click the "Submit" button.

Each question in this section is worth 3 marks. The maximum number of marks for this section is 6 marks.

Completing a Section

When you click **Submit**, the section is graded and results given to you. Clearly this is the reason that you cannot return to a section.

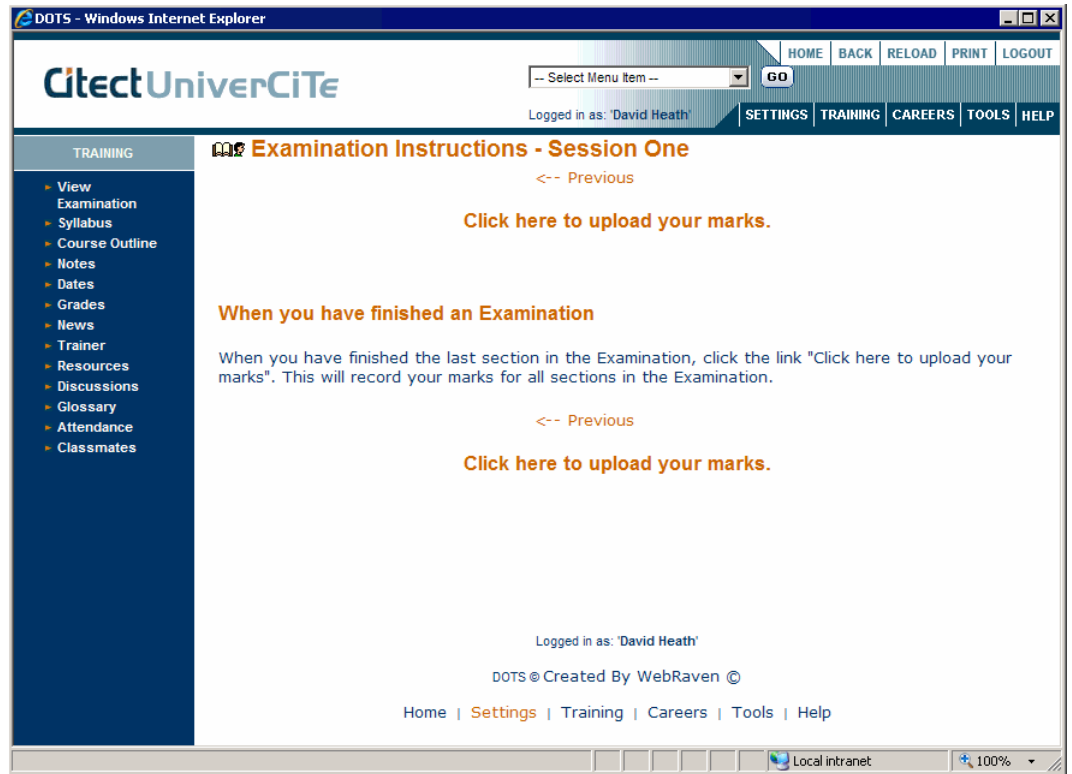
Total Score: 100.00%

OR 30.00 / 30.00

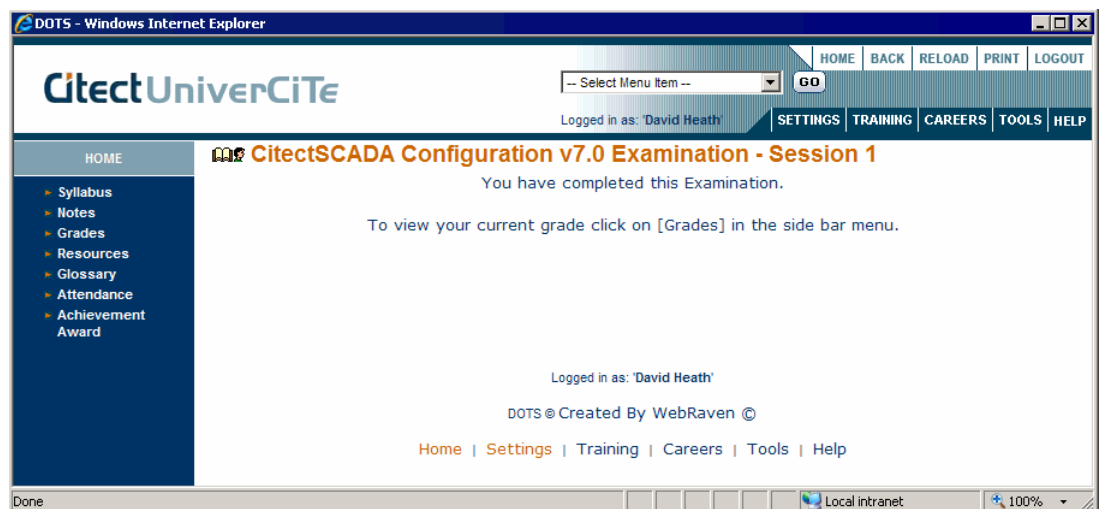
Completing the Exam

Uploading Your Marks

After submitting the final exam section, a screen will be presented inviting you to upload your marks.



Once done, you are advised that your final grade may be seen via the Grades link on the left-side menu. The exam is completed.



Chapter 2: Cicode Programming Exam Topics

Overview

Introduction Cicode Programming is the second of the CCSE exams. This exam is based around information that is covered in the Cicode Programming Course.

This Chapter Covers These Topics:

- Introduction to Cicode 2-2
- Variables 2-3
- Functions 2-4
- Conditional Executors 2-5
- Kernel and Debugging..... 2-6

Introduction to Cicode

Programming Language

Cicode is a simple, easy-to-use computer programming language designed especially for plant monitoring and control applications. It is a structured language similar to Visual Basic or 'C', however you need no previous programming experience to use it.

Using Cicode, you have access to all real-time data (variables) in the CitectHMI/SCADA project, and all CitectHMI/SCADA facilities - variable tags, alarms, trends, reports, and so on. You can use Cicode to interface to various resources on the computer, such as the operating system and communication ports.

Cicode supports advanced features including pre-emptive multi-tasking, multi-threads, and remote procedure calls that will be discussed later in this course.

Suggested Exercises

Use these suggested exercises to increase your understanding of the topic.

- Review the Cicode Programming Training manual.
- Add expressions to buttons to change the values of all tag types

Further Reading

Use the following references to assist your understanding of the topic.

- CitectSCADA Help Topic - *Using Cicode Commands.*
- CitectSCADA Help Topic - *Setting Variables.*
- CitectSCADA Help Topic - *Performing Calculations.*
- CitectSCADA Help Topic - *Using Cicode Expressions.*
- CitectSCADA Help Topic - *Using Cicode Functions.*
- CitectSCADA Help Topic - *Getting Runtime Operator Input.*

Variables

Operators

Cicode is used to manipulate data and perform tasks. Data manipulation is achieved using five classes of operators. These are the Mathematical, Bit, Logical, Relational and Format operators.

Suggested Exercises

Use these suggested exercises to increase your understanding of the topic.

- Review the Cicode Programming Training manual. Use the various mathematical operators to manipulate data.
 - Review the Order of Precedence of Operators.
-

Further Reading

Use the following references to assist your understanding of the topic.

- CitectSCADA Help Topic - Working with Operators.

Functions

User Functions

CitectHMI/SCADA is supplied with over 600 in-built functions. One or a combination of these functions can usually perform most tasks in your system. However, where system functionality cannot be achieved with in-built functions, you can write your own functions.

A Cicode function is a small program that may contain a collection of statements, variables, operators, conditional executors, and functions, in fact, of all the elements of Cicode.

Suggested Exercises

Use these suggested exercises to increase your understanding of the topic.

- Revise the syntax of Cicode functions.
 - Make a small Cicode program to create a standard Microsoft ActiveX Listbox at runtime, and fill this listbox with three items, and then select one of these items, and then store the value of the item in a DiskPLC variable.
-

Further Reading

Use the following references to assist your understanding of the topic.

- CitectSCADA Help Topic - *Working with Operators.*
- CitectSCADA Help Topic - *Cicode Function syntax.*
- CitectSCADA Help Topic - *Using Variables.*
- CitectSCADA Help Topic - *Using Arrays.*
- CitectSCADA Help Topic - *Converting and Formatting Cicode Variables.*

Conditional Executors

Four Conditional Executors

The statements that control decisions and loops in your functions are called conditional executors. Cicode uses four conditional executors: **IF**, **FOR**, **WHILE** and **SELECT CASE**.

Suggested Exercises

Use these suggested exercises to increase your understanding of the topic.

- Review the syntax of the four types of Conditional Executor in Cicode.
 - Create functions that test the functionality of the Conditional Executors.
-

Further Reading

Use the following references to assist your understanding of the topic.

- CitectSCADA Help Topic - *Working with Conditional Executors*.

Kernel and Debugging

Cicode Editor as a Debugger

The Cicode Editor can function in debug mode, to analyse running Cicode. Debugging Cicode requires that CitectHMI/SCADA is running, though you can turn debugging on and off as required. The operation of the debugger is controlled through Debug Options, with some options only taking effect on startup.

Suggested Exercises

Use these suggested exercises to increase your understanding of the topic.

- Review how the Cicode language supports multi-tasking and pre-empting.
 - Review the use of the Cicode Editor in Debug mode.
 - Add some breakpoints to the program you created earlier and use the Cicode debugger to step through it, by breakpoint and line by line.
-

Further Reading

Use the following references to assist your understanding of the topic.

- CitectSCADA Help Topic - *Debugging Cicode*.
- CitectSCADA Help Topic - *Using breakpoints*.
- CitectSCADA Help Topic - *Stepping through code*.

Chapter 3: Navigating the Knowledge Base

Overview

Introduction

The Knowledge Base contains three navigational tools to help you quickly find relevant information:

- Contents - so you can always find the start and also lists the Latest Articles.
 - Index - Lists all articles in numeric order
 - Search - the quickest way to find relevant articles. It allows you to query all of the text in the entire Citect Knowledge Base.
-

This Chapter Covers These Topics:

- Searching3-2

Searching

Search Queries	Learning about effective queries will help you to locate relevant articles. The simplest query consists of just one word. For example, to find articles about alarm pages, you could enter the word alarm. This query would return a list of all articles that contain the word 'alarm'. If the query word is common, a large number of articles will be displayed, and you may need to further narrow your search.
Enter Multiple Words	To narrow your search, enter more than one word. For example, to find articles about alarm pages, you could enter the words alarm page. This query would return all articles that contain both the words 'alarm' and 'page'. Some search engines require the keyword AND to be used for this kind of search - it is not necessary here.
Operators	Customise your queries with the NEAR, NOT and OR keyword operators. For example, the query alarms page not hardware, would exclude an article about the "hardware alarms page".
Literal Phrases	Put quotation marks around keywords if you want to search for a literal expression. For example, searching for "alarm page" would find articles that contain that exact phrase. This can be quite useful if you need to use a keyword in your search. For example, "exclusive or" contains the keyword OR, and would cause an error without the quotes.
Wild Cards	Use wild cards (* and ?) where you are uncertain about the form of a word. For example, if you are uncertain about whether to search for "alarms", "alarm", or "alarming", search instead for alarm*. The ? is similar, but works only for one character.