Geoprocessing Raster Data Using ArcGIS® Spatial Analyst

Copyright © 2009, 2010 Esri

All rights reserved.

Course version 2.1. Version release date October 2010.

Printed in the United States of America.

The information contained in this document is the exclusive property of Esri. This work is protected under United States copyright law and other international copyright treaties and conventions. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or by any information storage or retrieval system, except as expressly permitted in writing by Esri. All requests should be sent to Attention: Contracts and Legal Services Manager, Esri, 380 New York Street, Redlands, CA 92373-8100 USA.

EXPORT NOTICE: Use of these Materials is subject to U.S. export control laws and regulations including the U.S. Department of Commerce Export Administration Regulations (EAR). Diversion of these Materials contrary to U.S. law is prohibited.

The information contained in this document is subject to change without notice.

U. S. GOVERNMENT RESTRICTED/LIMITED RIGHTS

Any software, documentation, and/or data delivered hereunder is subject to the terms of the License Agreement. The commercial license rights in the License Agreement strictly govern Licensee's use, reproduction, or disclosure of the software, data, and documentation. In no event shall the U.S. Government acquire greater than RESTRICTED/LIMITED RIGHTS. At a minimum, use, duplication, or disclosure by the U.S. Government is subject to restrictions as set forth in FAR §52.227-14 Alternates I, II, and III (DEC 2007); FAR §52.227-19(b) (DEC 2007) and/or FAR §12.211/12.212 (Commercial Technical Data/Computer Software); and DFARS §252.227-7015 (NOV 1995) (Technical Data) and/or DFARS §227.7202 (Computer Software), as applicable. Contractor/Manufacturer is Esri, 380 New York Street, Redlands, CA 92373-8100, USA.

@esri.com, 3D Analyst, ACORN, Address Coder, ADF, AML, ArcAtlas, ArcCAD, ArcCatalog, ArcCOGO, ArcData, ArcDoc, ArcEdit, ArcEditor, ArcEurope, ArcExplorer, ArcExpress, ArcGIS, ArcGlobe, ArcGrid, ArcIMS, ARC/INFO, ArcInfo, ArcInfo Librarian, ArcLessons, ArcLocation, ArcLogistics, ArcMap, ArcNetwork, ArcNews, ArcObjects, ArcOpen, ArcPad, ArcPlot, ArcPress, ArcReader, ArcScan, ArcScene, ArcSchool, ArcScripts, ArcSDE, ArcSdl, ArcSketch, ArcStorm, ArcSurvey, ArcTIN, ArcToolbox, ArcTools, ArcUSA, ArcUser, ArcView, ArcVoyager, ArcWatch, ArcWeb, ArcWorld, ArcXML, Atlas GIS, AtlasWare, Avenue, BAO, Business Analyst, Business Analyst Online, BusinessMAP, CommunityInfo, Database Integrator, DBI Kit, EDN, Esri, Esri—Team GIS, Esri—The GIS Company, Esri—The GIS People, Esri—The GIS Software Leader, FormEdit, GeoCollector, Geographic Design System, Geography Matters, Geography Network, GIS by Esri, GIS Day, GIS for Everyone, GISData Server, JTX, MapIt, Maplex, MapObjects, MapStudio, ModelBuilder, MOLE, MPS—Atlas, PLTS, Rent-a-Tech, SDE, SML, Sourcebook·America, Spatial Database Engine, StreetMap, Tapestry, the ARC/INFO logo, the ArcGIS logo, the ArcGIS Explorer logo, the ArcPad logo, the Esri globe logo, the Esri Press logo, the GIS Day logo, the MapIt logo, The Geographic Advantage, The Geographic Approach, The World's Leading Desktop GIS, Water Writes, www.esri.com, www.geographynetwork.com, www.gis.com, www.gisday.com, and Your Personal Geographic Information System are trademarks, registered trademarks, or service marks of Esri in the United States, the European Community, or certain other jurisdictions.

Other companies and products mentioned herein may be trademarks or registered trademarks of their respective trademark owners.

C O N T E N T S

1 *Preparing for raster analysis*

Geoprocessing Raster Data Using ArcGIS Spatial Analyst
Welcome to Esri Training
Virtual classroom
ArcGIS Resource Center
The ArcGIS system
ArcGIS Desktop
ArcGIS Online
Course introduction
Course goals
ArcGIS Spatial Analyst
Course materials
Preparing for raster analysis
Learning objectives
Geoprocessing is…
The geoprocessing language
The geoprocessing framework
Raster cell coincidence
Expression evaluation
Raster resampling
Resample tool
Analysis environment
Setting output cell size
Setting output extent
Setting snap raster
Setting analysis mask
Setting output coordinate system
Environment settings
Importing Spatial Analyst
Exercise scenario
Exercise goals
Lesson review

2 *Building map algebra expressions*

Building map algebra expressions
Learning objectives
Think about…
Accessing map algebra
Map algebra components
Input data

Copyright © 2009, 2010 Esri

Map algebra operators
Map algebra tools (functions)
Tool parameters
A few expression syntax rules
Function syntax rules
Activity: Find eight errors
Special cell values in map algebra
Working with NoData
Con function
Exercise goals
Lesson review

3 *Working with raster functions*
Working with raster functions
Learning objectives
Map algebra functions
Local functions
Focal functions
Focal neighborhoods
Zonal functions
Raster zones and regions
Global functions
Slice tool
Region Group tool
Region Group: Using the Cross option
Majority Filter tool
Nibble tool
Expand tool
Shrink tool
Thin tool
Exercise goals
Appendix exercise goals
Lesson review

4 *Building models using fuzzy overlay*
Building models using fuzzy overlay
Learning objectives
Think about…
Spatial models
Suitability modeling steps: Binary analysis
Suitability modeling steps: Fuzzy analysis
Fuzzification
Fuzziness vs. probability
Fuzzy membership

 Copyright © 2009, 2010 Esri

Hedges
Fuzzification of categorical data
Fuzzy overlay analysis
Exercise scenario
Exercise goals
Lesson review

5 *Course conclusion*
Course conclusion
Course goals
Esri training services
Where do you go from here?
Course evaluation
Thank you

Copyright © 2009, 2010 Esri