

User Manual

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1.0 Introduction

We are pleased that you have chosen to use NAUDigiTool for your business and educational needs. NAUDigiTool is a powerful system that allows students to practice working with Karnaugh maps and numeric conversions. Some of the key features of the system include:

- A module that covers Karnaugh map truth tables, converting them, grouping them, and finding equations for them
- A module that covers numeric conversions in binary, octal, decimal, and hexadecimal bases
- Ability for users to receive hints and get feedback on problems
- Practice mode that allows users to practice working with Karnaugh maps and numeric conversions of their own choosing
- Login functionality that allows users to save their progress within the system and load it upon returning to the system

The purpose of this user manual is to help you, the client, successfully install, administer, and maintain the product in your actual business context going forward. Our aim is to make sure that you, along with your students, are able to benefit from our product for many years to come!

2.0 Installation

The application is already deployed and usable on <http://naudigitool.rf.gd/index.html>.

If you need to move to a different host, you will need FTP software such as FileZilla to transfer files onto the server. First, you create a connection based on the FTP information that is given.

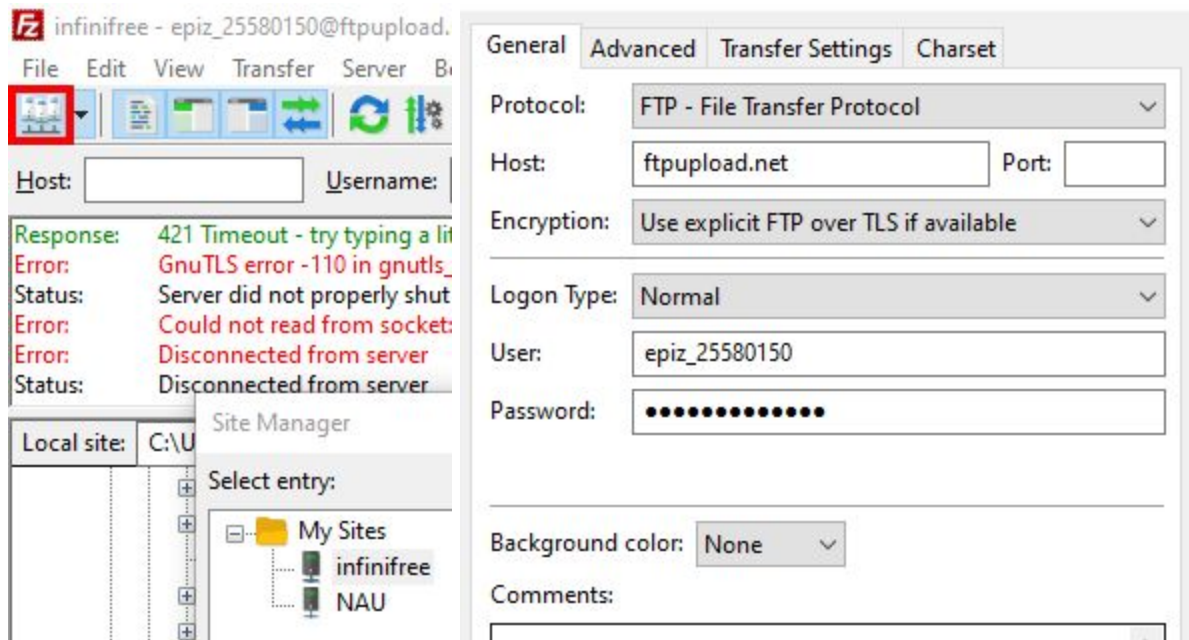


Figure 1. Filezilla connection manager and connection info

Then, transfer all of the production necessary files into the htdocs (or wherever you are told to put files for a website) directory of the server.

Filename	Filesize	Filetype	Last modified	Permissions	Owner/Gro...
..					
CSS		File folder	5/5/2020 6:09:3...	0755	25580150 2...
dist		File folder	5/5/2020 6:10:3...	0755	25580150 2...
HTML		File folder	5/5/2020 6:21:1...	0755	25580150 2...
JavaScri...		File folder	5/5/2020 6:25:1...	0755	25580150 2...
node_m...		File folder	5/5/2020 6:28:5...	0755	25580150 2...
attempt...	1,031	PHP File	5/5/2020 12:51:...	0644	25580150 2...
createSa...	1,328	PHP File	5/5/2020 6:07:1...	0644	25580150 2...
dbinfo.js...	164	JSON File	5/5/2020 6:37:4...	0644	25580150 2...
homepa...	1,938	Chrome H...	5/5/2020 6:07:2...	0644	25580150 2...
index.ht...	681	Chrome H...	5/5/2020 6:07:3...	0644	25580150 2...
loadSave...	1,049	PHP File	5/5/2020 6:07:4...	0644	25580150 2...
login.php	1,254	PHP File	5/5/2020 6:07:5...	0644	25580150 2...
modules...	3,165	Chrome H...	5/5/2020 6:08:5...	0644	25580150 2...
practice...	1,250	Chrome H...	5/5/2020 6:09:0...	0644	25580150 2...
register....	619	Chrome H...	5/5/2020 6:09:0...	0644	25580150 2...
register....	875	PHP File	5/5/2020 6:09:0...	0644	25580150 2...

Figure 2. Necessary files shown in htdocs directory for InfinityFree website hosting

To move the database you will first need to export the current one by logging into the database account and navigating to phpMyAdmin. Once in the database, exporting is as easy as clicking the “export” button and “go”.

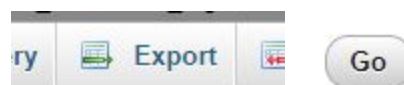


Figure 3. phpMyAdmin Export and Go button

Then connect to the new database and use “Import,” select the file that you got from exporting and click “go”.

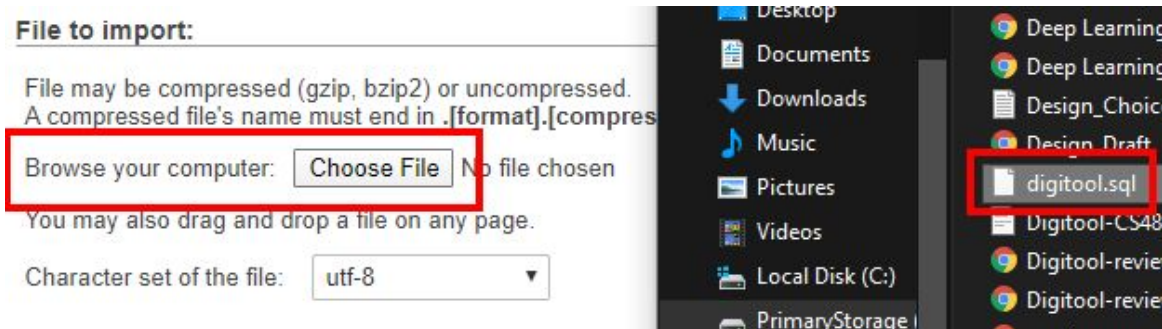


Figure 4. phpMyAdmin Import page

Lastly, you will need to change the lines in dbinfo.json to match the connection info for the new database.

As a side note, if the application gets set up on NAU ITS servers, it is possible to have users managed by CAS instead of the login system we used. To do this all you need to have is a .htaccess file in the main directory containing:

```
PerlAuthenHandler NAU::Apache::AuthNAUZ
AuthType NAUZ

require valid-user
```

You can also add in line 3 a path to a rules file that can restrict the users from all of NAU down to just the EE110 class.

```
PerlSetVar NAUZAAuthFile /path/to/rules.xml
```

For information on what goes into the xml file please view:

https://nau.service-now.com/kb_view.do?sysparm_article=KB0013777&sysparm_rank=4&sysparm_tsqueryId=595c5a52dbe0dc90e9245c68dc9619de

To keep the database working you will need to change all:

```
$_POST['id'];  
to  
$_ENV['REMOTE_USER'];
```

in each php file that needs the student's ID.

3.0 Configuration and Daily Operation

3.1 Getting Started

Digitool is very easy to use and the users only need to do a few things in order to operate our web application. There is simply no configuration since the product is hosted on a website. All the user has to do is simply type in the url given to our client and they will be directed to our product. The user should first create an account by registering a username and password. We highly recommend creating a random username and newly thought of password just to be safe. Their information will then be collected by the database and after that they'll successfully be able to log in. After the user logs in, their screen will navigate to the homepage as Figure 5 shows.



Figure 5. Homepage

The homepage gives information about our website and how everything functions. From there, they can choose “Modules” or “Practice Mode” to continue their learning. If the user were to click on “Modules” as shown in Figure 6, they will complete a series of questions that go over Karnaugh Maps or Numeric Conversions and eventually the questions will get harder as they progress through each Module.

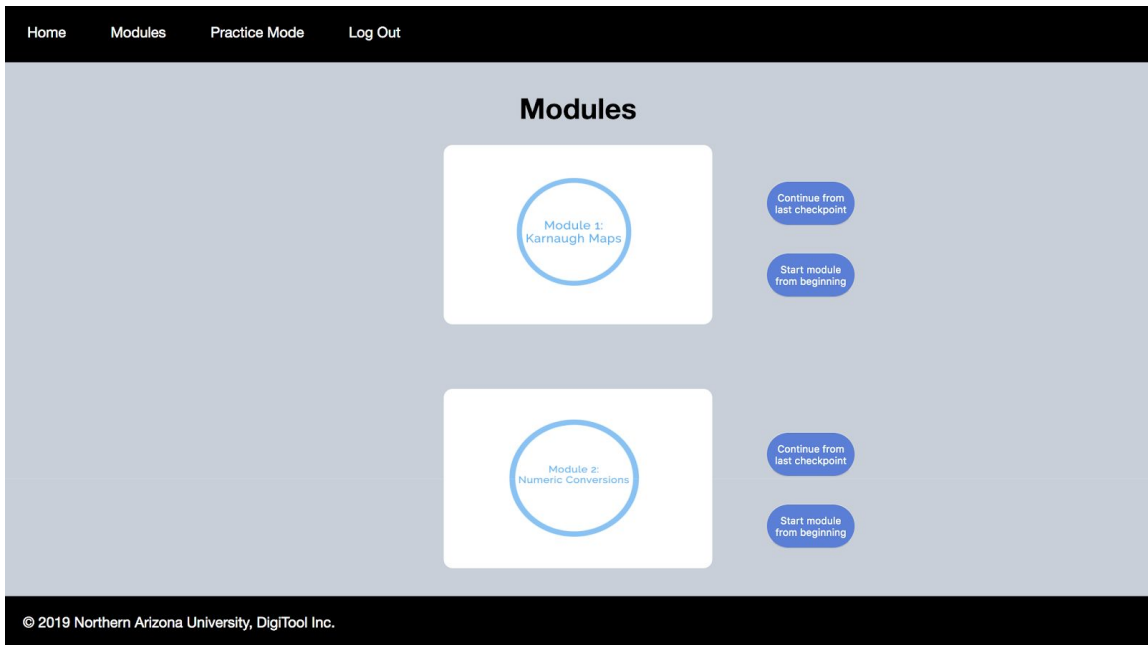


Figure 6. Modules Page

Once the user clicks on one of the two Modules, two buttons will pop up to the right of the Module they clicked on. The topmost button to the right of each module will allow the user to continue from where they previously left off if they were to log out and log in back another time. This button will only work if they started a module and left the module itself without closing the current tab (tabs are closed by clicking the small “x” button at the top of your web browser). The bottommost button to the right of each module will allow the user to start a module from the beginning if they wish.

On the other hand, if the user clicks on “Practice Mode”, they would be able to select the type of topic they would want to practice / study and our web application will randomly generate a corresponding question to match their selection as shown in Figure 7. They would be able to try these questions as many times as they wanted to to achieve the effect of practice.

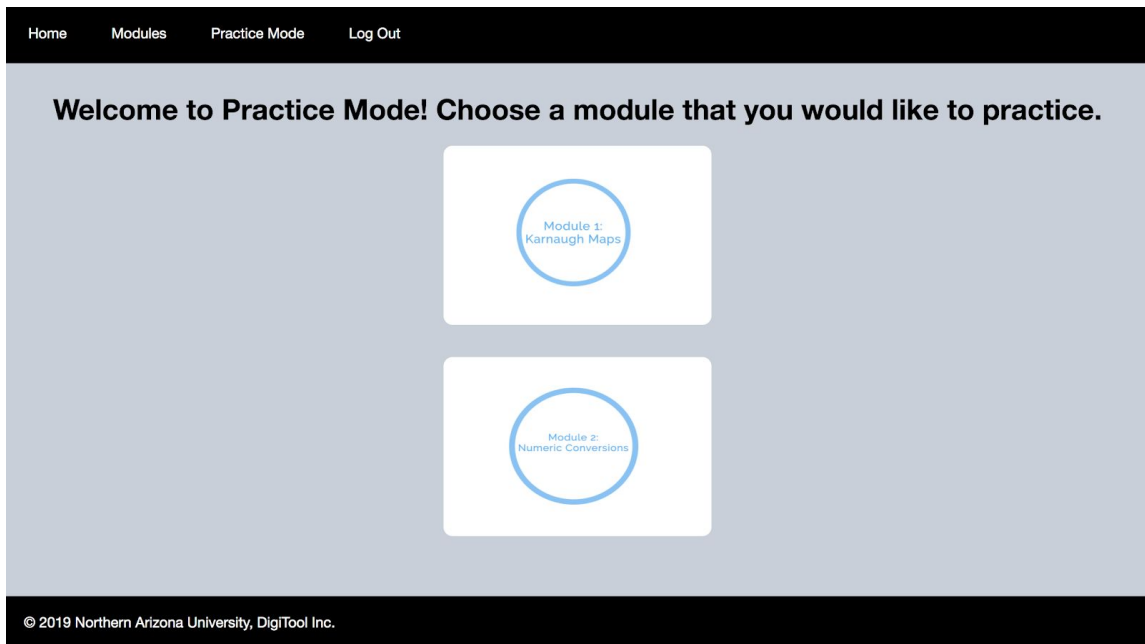


Figure 7. Practice Mode

Once the user clicks on this mode, they will be directed to another page in which they can select one variable type that they want to work with and a problem that they want to practice, as shown in Figure 8. Once they are done with that, they can click submit.

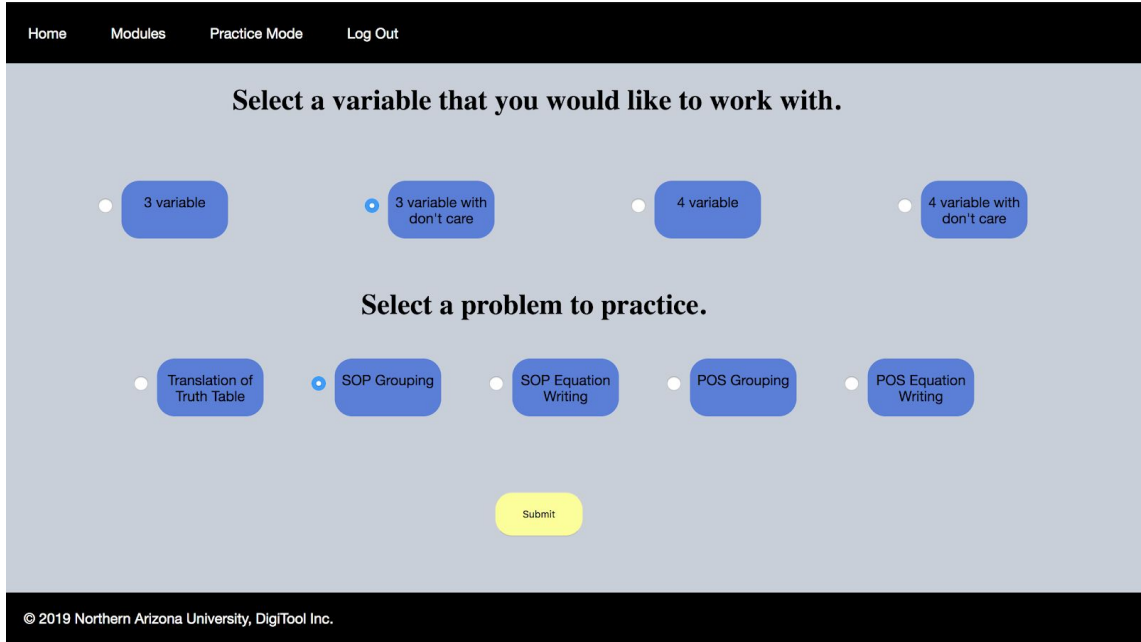


Figure 8. Practice Mode Layout

Once the user clicks submit a problem will be generated based on the preferences you selected, as shown in Figure 9. The difference between practice mode and regular module mode is that there are no stars, time, or mistakes given. The following information also remains the same for Practice Mode: Module 2.

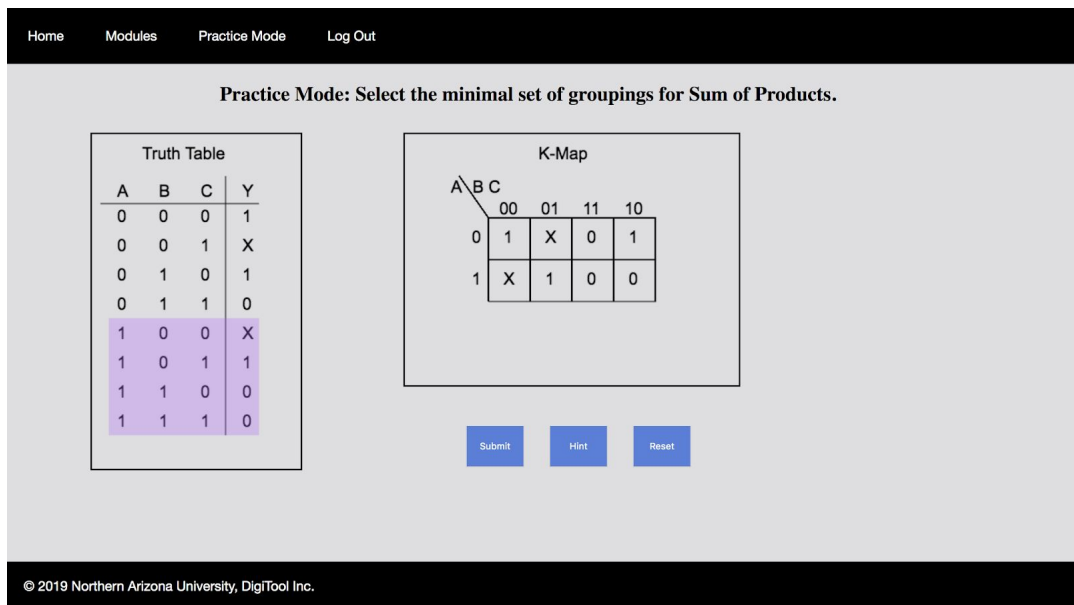


Figure 9. Practice Mode Problem Example

3.2 Module 1: Karnaugh Maps

Translating Truth Tables

When it comes to translating truth tables, simply match the Karnaugh Map to the truth table by inputting 1s, 0s, or Xs into the Karnaugh Map. Xs aren't case sensitive so it doesn't matter if the Xs are capital or lower case.

Grouping

Grouping involves the user clicking and dragging a rectangle across the group that they wish to create. Sometimes it may take 2 or 3 traces in order for the rectangle to format, but other than that it should be pretty easy. The way things are grouped are prioritized as follows:

- 1) 16s
- 2) 8s
- 3) 4s
- 4) 2s

You want to prioritize these groups in order to eliminate redundancy. The way a user pathing in which the user needs to group are as follows:

- 1) Horizontal
- 2) Vertical
- 3) Squares (This is only for 4s)
- 4) Horizontal Wraps (This is only for 8s, 4s, 2s)
- 5) Vertical Wraps (This is only for 8s, 4s, 2s)

For additional help, please view the videos given to our client that explain in additional detail how the user can group terms together.

Writing Equations

When it comes to writing equations there's two things users should take note of. The first thing is that terms can be written in any order BUT the term itself needs to be in alphabetical order. For example (SOP):

Wrong: C'A + BA or BA + C'A

Right : AC' + AB or AB + AC'

For example (POS). Unfortunately this is only way that we configure it to where the answer would work:

Wrong: (C') * (B+A) or (B+A) * (C')

Right : (C') * (A+B) or (A+B) * (C')

The user should also take note that spaces within a term doesn't matter as well as capitalization. This next example regarding space and capitalization can be used for both POS and SOP:

Ex: AC'+aB or ab + AC' or ab + ac' or or AB + AC'

Writing equations also aren't case sensitive so it doesn't matter if the terms are capital or lowercase. For additional help, please view the videos given to our client that explain in additional detail how the user should write equations.

3.3 Module 2: Numeric Conversions

Binary Conversions

When it comes to binary conversions, users will convert given binary numbers to the other bases by inputting their answer in the text boxes next to the questions. The base that the given number is being converted to will be specified on the web page.

Octal Conversions

When it comes to octal conversions, users will convert given octal numbers to the other bases by inputting their answer in the text boxes next to the questions. The base that the given number is being converted to will be specified on the web page.

Decimal Conversions

When it comes to decimal conversions, users will convert given decimal numbers to the other bases by inputting their answer in the text boxes next to the questions. The base that the given number is being converted to will be specified on the web page.

Hexadecimal Conversions

When it comes to hexadecimal conversions, users will convert given hexadecimal numbers to the other bases by inputting their answer in the text boxes next to the questions. The base that the given number is being converted to will be specified on the web page.

Other Information

The module is split into two parts, with the first half being based on whole numbers and the last half being based on fractions. Depending on whether the number is whole or a fraction, the answer will also be whole or a fraction. In the case of converting to hexadecimal numbers, users can enter hexadecimal numbers with either capital or lowercase letters and it will still work.

4.0 Maintenance

At the end of each semester when you've collected all the data and your students have moved on, you will want to clean out the database so you have a clean slate for the next class. This is shown in detail in the google drive videos.

5.0 Troubleshooting

If our website were to crash or freeze we recommend refreshing the webpage to fix the issue. If the issue still persists, we recommend closing the browser and trying again. Another thing that could be an issue is the server that the website is currently on. It could be undergoing maintenance so we recommend waiting a couple hours or so and trying again. Solutions could be to contact NAU ITS or view the support link for the site itself, <https://infinityfree.net/contact/>, to find the problems that you may be faced with. We recommend viewing the support link since it's actually hosted on their site. Another alternative could also be to upgrade the site to premium, but the downside is that it actually costs money, but you'd be able to get one on one support if the problem still exists. As the website gets updated and upgraded, additional troubleshooting issues would have to be logged to keep track of additional troubleshooting issues that could occur.

6.0 Conclusion

Once again we are happy that we were able to satisfy your needs and desires and wish you the very best. We hope that this product can be further developed so that it can be even better than it currently is! Best wishes from your developers: Traybourne North, Spencer Clark, Miguel Quinones, and Langqing Dai.