**DAILY ASSESSMENT FORMAT**

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| **Date:** | **4/06/2020** | **Name:** | **DHAMINI C L** |
| **Course:** | **Digital Design Using HDL** | **USN:** | **4AL17EC025** |
| **Topic:** | **Hardware modeling using Verilog &amp;**  **fpga and asic** | **Semester & Section:** | **6TH & A** |
| **Github Repository:** | **DHAMINI-CL-Course** |  |  |

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| **FORENOON SESSION DETAILS** |
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| **Report:**  **Hardware modeling using Verilog**  **Hardware modeling using Verilog.it uses various digital circuit modeling issues using Verilog**  **,writing test benches and some case studies.**  **Fpga and asic**  **FPGA Basics – A Look Under the Hood An introductory look inside Field Programmable Gate**  **Arrays. We’ll go over:Strengths &amp; Weaknesses of FPGAs How FPGAs work What’s inside an**  **FPGA So you keep hearing about FPGAs being utilized in more and more applications, but aren’t**  **sure whether it makes sense to switch to a new technology. Or maybe you’re just getting into the**  **embedded world and want to figure out if an FPGA-based system makes sense for you or not.This**  **paper provides an overview of some of the key elements of FPGAs for engineers interested in**  **utilizing FPGA-based technologies. It’s worth noting that this is a complex topic, and as such, some**  **topics are not covered, some are just introductory, and others will evolve over time.**  **This paper should still give you a lot of helpful information if you’re new to the world of**  **FPGAs.What are the most important things you should know right away?Get out of the software**  **mindset – You’re not writing software. Let me say that again because this is the single most**  **important point if you’re thinking about working with FPGAs.You-are-NOT-writingsoftware.You’re**  **designing a digital circuit. You’re using code to tell the chip how to configure itself.Plan for lots of**  **bugs – yes, plan for them. They are going to happen. Way more than you expected. If you’re a**  **newbie developer, you need to pull in someone that has experience with FPGA development to help**  **with this estimate.Application-specific realities – you ought to concern yourself with realities**  **revolving around cyber security and safety, as FPGAs are a different animal than what you’re likely**  **used to.What is an FPGA?An FPGA is a (mostly) digital, (re-)configurable ASIC. I say mostly**  **because there are analog and mixed-signal aspects to modern FPGAs. For example, some have A/D**  **converters and PLLs. I put re- in parenthesis because there are actually one-timeprogrammable**  **FPGAs, where once you configure them, that’s it, never again. However, most FPGAs you’ll come**  **across are going to be re-configurable. So what do I mean by digitally configurable ASIC?I mean**  **that at the core of it, you’re designing a digital logic circuit, as in AND, OR, NOT, flip-flops, etc. Of**  **course that’s not entirely accurate and there’s much more to it than that, but that is the gist at its**  **core.he players –There are currently two big boys: Altera (part of Intel) and Xilinx, and some**  **supporting players (e.g. Actel (owned by Microsemi)).The main underlying technology options are**  **SRAM-based (this is the most common technology), flash, and anti-fuse. As you might imagine,**  **each option has its own pros and cons. Check this out for some more details.Strengths / best suited**  **for:Much of what will make it worthwhile to utilize an FPGA comes down to the low-level functions**  **being performed within the device. There are four processing/algorithm attributes defined below that**  **FPGAs are generally well-suited for. While just one of these needs may drive you toward an FPGA,**  **the more of these your application has, the more an FPGA-based solution will appeal.Parallel**  **processes – if you need to process several input channels of information (e.g. many simultaneous A/D**  **channels) or control several channels at once (e.g. several PID loops). High data-to-clock-rateratio –**  **if you’ve got lots of calculations that need to be executed over and over and over again, essentially**  **continuously. The advantage is that you’re not tying up a centralized processor. Each function can**  **operate on its own. Large quantities of deterministic I/O – the amount of determinism that you can**  **achieve with an FPGA will usually far surpass that of a typical sequential processor. If there are too**  **many operations within your required loop rate on a sequential processor, you may not even have**  **enough time to close the loop to update all of the I/O within the allotted time. Signal processing –**  **includes algorithms such as digital filtering, demodulation, detection algorithms, frequency domain**  **processing, image processing, or control algorithms. Weaknesses / not optimal for:With any**  **significant benefit, there’s often times a corresponding cost.**  **blocks that allow for various voltage standards (e.g. LVCMOS, LVDS) as well as timing delay**  **elements to help align multiple signals with one another (e.g. for a parallel bus to an external RAM**  **chip).Clocking and routing –This is really a more advanced topic, but critical enough to at least**  **introduce. You’ll likely use an external oscillator and feed it into clocking resources that can**  **multiply, divide, and provide phase-shifted versions of your clock to various parts of the**  **FPGA.Routing resources not only route your clock to various parts of the FPGA, but also your data.**  **Routing resources within an FPGA are one of the most underappreciated elements, but so critical.**  **Check out this sea of madness:What’s Inside – Advanced componentsHard cores – These are**  **functional blocks that (at least for the most part) have their own dedicated logical resources. In other**  **words, they are already embedded into your FPGA silicon. You configure them with various**  **parameters and tell the tools to enable them for you. This could include functions such as high-speed**  **communications (e.g. high-speed serial, Ethernet), low-speed A/D converters for things like**  **measuring slowly varying voltages, and microprocessor cores to handle some of the functions that**  **FPGA logic is not as well suited for.Soft cores – These are functional blocks that don’t have their**  **own dedicated logical resources.** |

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| **Date:4/6/2020** |  | **Name: DHAMINI C L** |  | |
| **Course:PYTHON** |  | **USN:4AL17EC025** |  | |
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| **Topic: Project Exercise on Building a Geocoder Web Service** |  | **Semester & Section:6TH A SEC** |  | |
| **AFTERNOON SESSION DETAILS** | | | |
| **Image of session** | | | |
| **Report – Report can be typed or hand written for up to two pages.** Geocode the placenames in the CSV using Geopy, Pandas Now that we have data, we will use this as our source to make a web map. Web maps typically represent locations and features from geographic data formats such as geoJSON and KML. Every location in a geographic data file can be considered to have geometry (such as points, lines, polygons) as well as additional properties. Web maps typically understand locations as a series of coordinates. For example, 43.6426,-79.3871 would represent the exact coordinates of the [CN Tower in Toronto](https://en.wikipedia.org/wiki/CN_Tower).  In our data file, we have a list of placenames in our CSV data (the Area Name column), but no coordinates. What we want to do then is to somehow generate coordinates from these locations. This process is called geocoding.  So here is our first problem to solve: how can we geocode placenames? How could we take an entry such as “CN Tower” and add the coordinates 43.6426,-79.3871 to it automatically?  To clarify, we need to figure out how to gather coordinates for a location for each row of a CSV file in order to display these locations on a web map.  There’s a simple way to do this: you can look up a coordinate online in Google Maps and put each coordinate in your spreadsheet manually. But, if you had 5,000 points the task becomes a little bit more daunting. If you’re faced with a repetitive task, it might be worthwhile to approach it programmatically.  If you’re familiar with Programming Historian, you might have already noticed that there are many [lessons available on how to use Python](https://programminghistorian.org/lessons/?topic=python). Python is a great beginner programming language because it is easy to read and happens to be used a lot in GIS applications to optimize workflows. One of the biggest advantages to Python is the impressive amount of libraries which act like pluggable tools to use for many different tasks. Knowing that this is a good programmatic approach, we’re now going to build a Python script that will automate geocode every address for us.  [Geopy](https://github.com/geopy/geopy) is a Python library that gives you access to the various geocoding APIs. Geopy makes it easy for Python developers to locate the coordinates of addresses, cities, countries, and landmarks across the globe using third-party geocoders and other data sources. Geopy includes geocoders built by OpenStreetMap Nominatim, ESRI ArcGIS, Google Geocoding API (V3), Baidu Maps, Bing Maps API, Yahoo! PlaceFinder, Yandex, IGN France, GeoNames, NaviData, OpenMapQuest, What3Words, OpenCage, SmartyStreets, geocoder.us, and GeocodeFarm geocoder services.  [Pandas](https://pandas.pydata.org/pandas-docs/stable/dsintro.html#dataframe) is another python library that we will use. It’s very popular library amongst scientists and mathematicians to manipulate and analyse data.  Finally, [Pip](https://pip.readthedocs.org/en/stable/) is a very useful package manager to help you install things like Geopy and Pandas! If you’ve [already installed Python](https://programminghistorian.org/lessons/introduction-and-installation) and [installed pip](https://programminghistorian.org/lessons/installing-python-modules-pip), type pip list to see if you already have the geopy and pandas packages installed. If you do not have pip installed, you can download [get-pip.py](https://bootstrap.pypa.io/get-pip.py), then from your command line go to the directory where get-pip.py is located and run  python get-pip.py | | | |