Choose the Right Hardware

Scenario 1: Manufacturing

Client Requirements and Potential Hardware Solution

Look through the scenario and find any relevant client requirements. Then, suggest a potential hardware type and explain how this hardware would satisfy each of the requirements.

Which hardware might be most appropriate for this scenario? (CPU / IGPU / VPU / FPGA)
FPGA

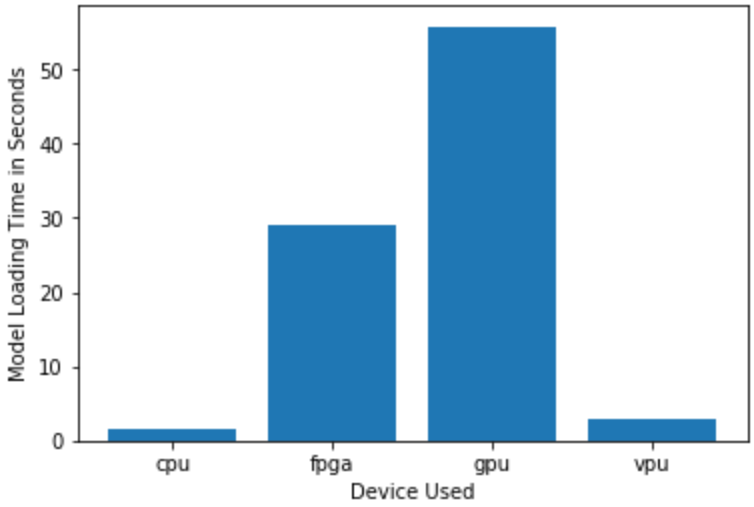
Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
Example requirement: The client requires a tiny device to be connected to their CPU—and their budget is only about $100 for each device.	*Example explanation:* VPU or NCS2 is only about 27.40 mm in size and would fit in the price range.
The system needs to be flexible so that it can be reprogrammed and optimized to quickly detect flaws in different chip designs	FPGAs are flexible
They would ideally like the system to last for at least 5-10 years	FPGAs are guaranteed long lifespan of ~10 years

Queue Monitoring Requirements

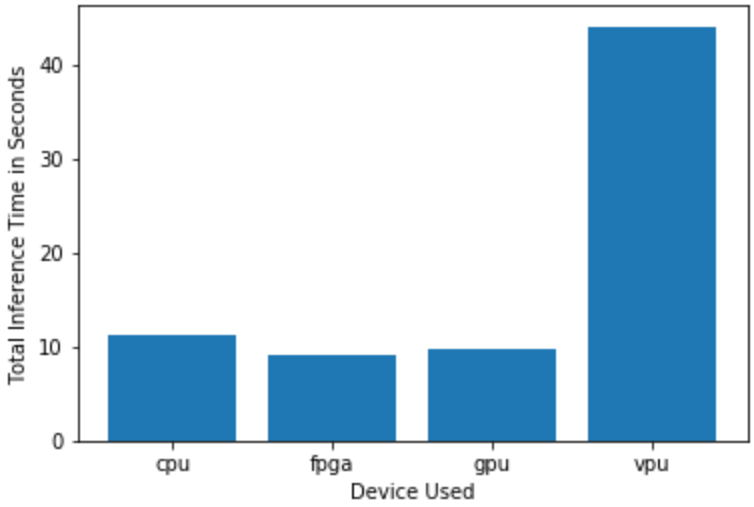
Maximum number of people in the queue	*2*
Model precision chosen (FP32, FP16, or Int8)	*FP16*

Test Results

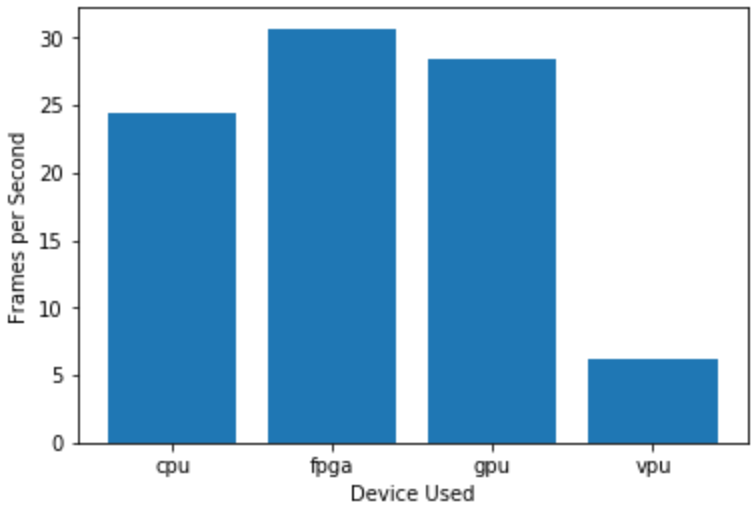
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).



Model Load Time



Inference Time



FPS

Final Hardware Recommendation

Now synthesize your points from above and provide a brief write-up describing why the chosen hardware is the best choice for this scenario. Be sure to discuss the client's requirements, the test results, and how these relate to one another (e.g., perhaps one of the devices performed better than the rest, but does not meet one of the client's requirements).

Write-up: Final Hardware Recommendation
Although the FPGA is not that fast compared to iGPU/CPU, it fits more the client's requirements like flexibility and long lifespan.

Scenario 2: Retail

Client Requirements and Potential Hardware Solution

Look through the scenario and find any relevant client requirements. Then, suggest a potential hardware type and explain how this hardware would satisfy each of the requirements.

Which hardware might be most appropriate for this scenario? (CPU / IGPU / VPU / FPGA)
IGPU

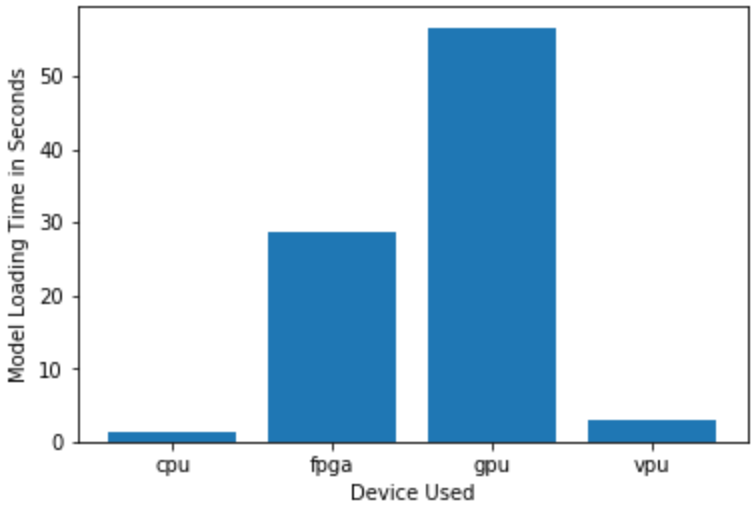
Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
Mr. Lin does not have much money to invest in additional hardware	He already owns Intel i7 core processors which we can use it's IGPU.
He would like to save as much as possible on his electric bill	GPUs have Configurable Power Consumption, unused sections in a GPU can be powered down to reduce power consumption.

Queue Monitoring Requirements

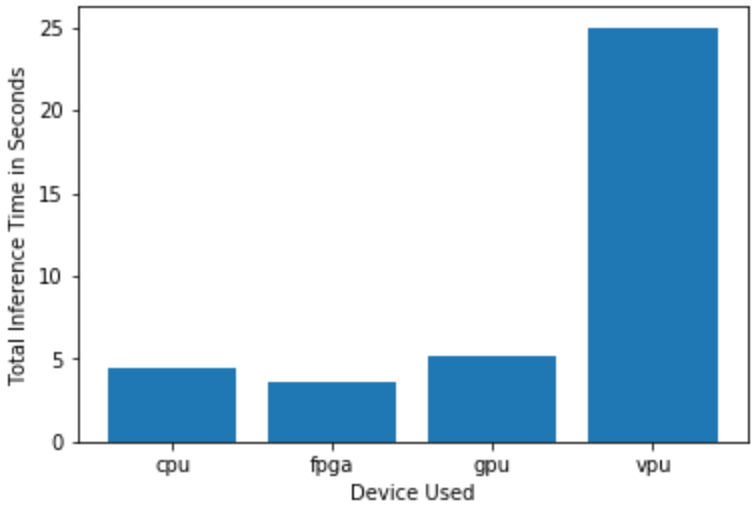
Maximum number of people in the queue	*2*
Model precision chosen (FP32, FP16, or Int8)	*FP16*

Test Results

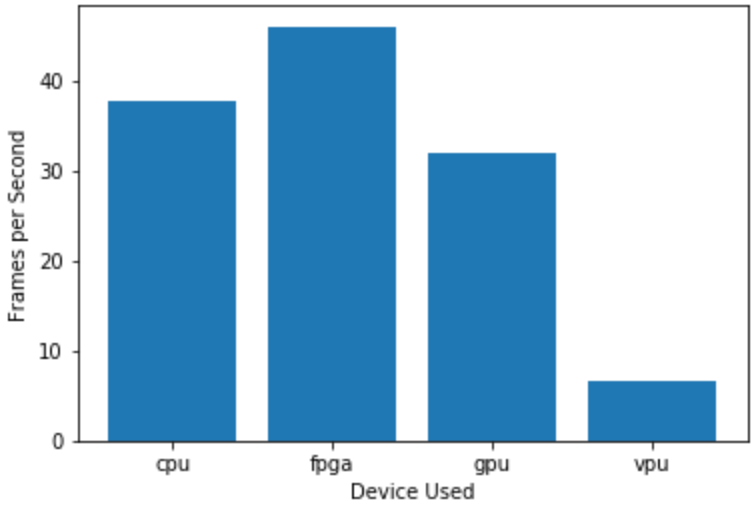
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).



Model Load Time



Inference Time



FPS

Final Hardware Recommendation

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Write-up: Final Hardware Recommendation
According to Mr. Lin's requirements to save both cost and power, iGPU is the optimum solution to him.

Scenario 3: Transportation

Client Requirements and Potential Hardware Solution

Look through the scenario and find any relevant client requirements. Then, suggest a potential hardware type and explain how this hardware would satisfy each of the requirements.

Which hardware might be most appropriate for this scenario? (CPU / IGPU / VPU / FPGA)
VPU

Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
Budget allows for a maximum of $300 per machine (7 machines)	*NCS2 (VPU) is an inexpensive option, typically costing around $70 to $100.*

	Also we can install up to 3 NCSs per machine (will cost around $210 to $300) which is in the budget.
Monitor the queues in real-time and quickly direct the crowd in the right manner	NCS2 (VPU) is scalable, Adding multiple NCS2s will allow multiple inferences to run in parallel.

Queue Monitoring Requirements

Maximum number of people in the queue	*4*
Model precision chosen (FP32, FP16, or Int8)	*FP16*

Test Results

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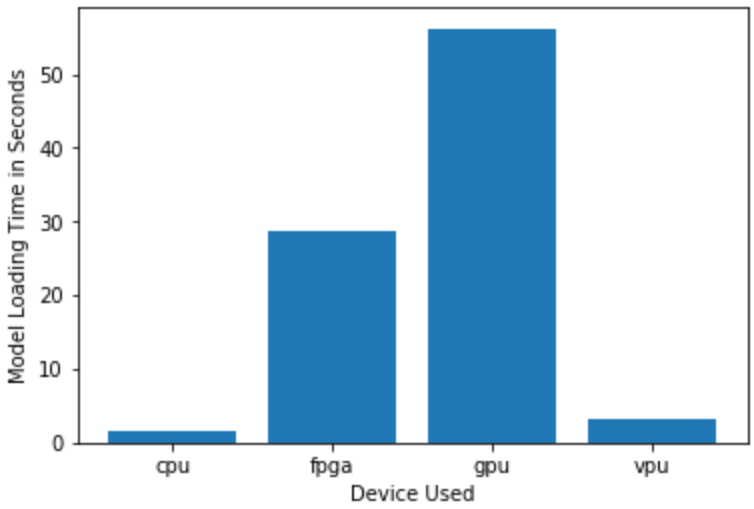
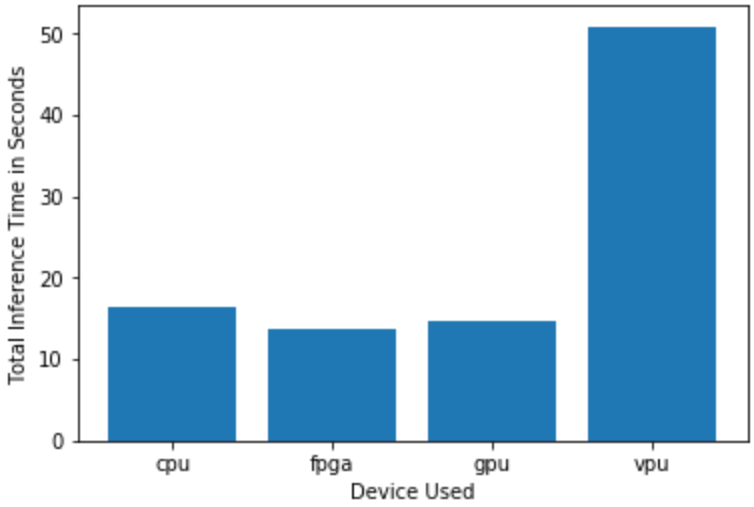
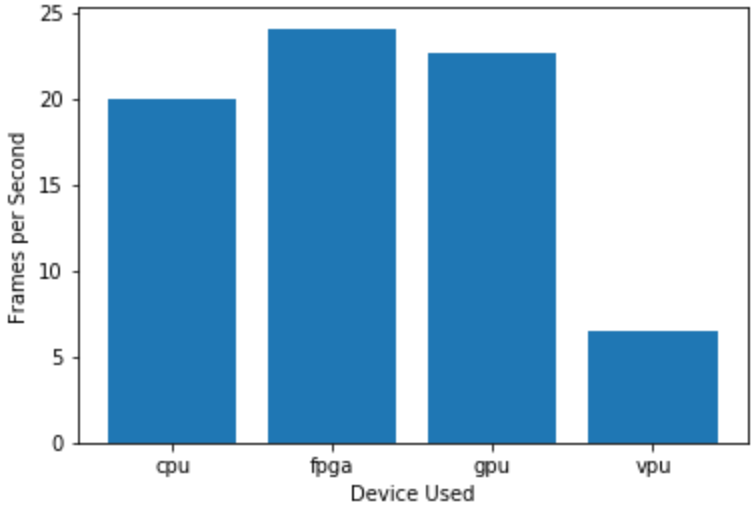


Model Load Time



Inference Time



FPS

Final Hardware Recommendation

Now synthesize your points from above and provide a brief write-up describing why the chosen hardware is the best choice for this scenario. Be sure to discuss the client's requirements, the test results, and how these relate to one another (e.g., perhaps one of the devices performed better than the rest, but does not meet one of the client's requirements).

Write-up: Final Hardware Recommendation
As this scenario is real-time, speed is an important factor. VPUs is a great choice, but we can add multiple devices to improve the speed.