UiO / IFI / PUT
Spring 2025
Questions on Cyberforaging

1. What is cyber-foraging? Give examples.

2. Explain what are the concepts behind the notions of thin-client and thick-client.

3. What are the potential benefits of cyber-foraging? Explain each one carefully.

4. Taking into account the concept of cyber-foraging, present the definition of **fidelity**. Give an example.

5. In the scope of cyber-foraging, complete the following table using only: “High”, “Low”, “Large”, “Small”, or N/A.

Factor	Favorable for remote execution	Favorable for local execution
Network bandwidth		
Network latency		
Disparity between compute resources		
Granularity of computation		
Parallelism in computation		
Memory/storage requirements		
Size of inputs/outputs		
Load on remote computers		
Wireless network power		
Sensitivity of activity		

6. Consider a cyber-foraging scenario in which the computation is not asynchronous and is on the critical path of the application. When is performance improved?

7. Consider the several offloading solutions from a mobile device to the cloud, to support augmented execution for mobile phones:
    a. What **augmented execution** refers to?
    b. One of the solutions is called **background augmentation**: i) describe in what it consists, and ii) provide an example illustrating its usefulness.

8. Consider an application P running on mobile device A. Take into account the mechanism that supports the partitioning of P in such a way that, when P is running, some of P's objects are relocated to another computer B in the cloud. What is the main concern (related to object invocation) that we must have so that the partitioning has a minimum negative performance impact on P?

9. What is partitioning?

10. When partitioning, after choosing the metrics and constraints that express the goals for partitioning, what must be done? What are the restrictions for partitions?

11. Give examples of partitioning.

12. Regarding managing issues of cyber-foraging, mention the factors that impact the location decision. What are the several options regarding location?

13. Provide examples in which the latency of the network is relevant and makes the option for having the code close to the edge a good option.

14. Cyber foraging systems measure network supply (i.e., the available bandwidth and latency) through a variety of strategies. Which are these ones? Explain each one.

15. In cyber-foraging, the Network Measurement and Estimation has several challenges. Say what these are and describe them.

16. Say if you agree with the following sentence and justify: "*The supply of battery energy is one of the simplest resource values to measure and estimate while the demand for battery energy is one of the most difficult*". Justify your answer

17. Direct measurement of battery usage has two main drawbacks. Say what these are and justify

18. Many cyber foraging systems use a model-based approach to estimate energy demand. Explain what this is.

19. Regarding cyber-foraging, there are also other aspects to consider when talking about resource estimation such as File Cache Measurement and Estimation, Errors During Partitioning, and Replication. Explain what these are.

20. Regarding cyber-foraging, which tasks are the best suited for cyber foraging?

21. Regarding cyber-foraging, the location of surrogates can be where?

22. Regarding cyber-foraging, what is a cloudlet? What can it provide? What is the underlying vision and where could it be deployed?

23. Regarding cyber-foraging, w.r.t. security, the isolation if operations is of paramount relevance. How is this typically done?

24. Regarding cyber-foraging, what is a sandboxing, what are its functions and its goals?

25. Regarding isolation in cyber-foraging, there are process isolation, application VM, and hardware VM. Compare them regarding safety, flexibility, transparency, overhead, and start-up time.

26. Explain and describe the concept of data staging.