theTradeDesk

Coding Exercise – Software Developer

This exercise consists of two parts: design and implementation. It is designed to take a few hours, but there is no hard time limit – please do not feel rushed. Also, questions are welcome, so feel free to ask.

Design

Provide a class design for an N-way, set-associative cache.

Design requirements:

- The cache itself is entirely in memory (i.e. it does not communicate with a backing store or use any I/O)
- The client interface should be type-safe for keys and values and allow for both the keys and values to be of an arbitrary type (e.g., strings, integers, classes, etc.). For a given instance of a cache all keys will be the same type and all values will be the same type.
- Design the interface as a library to be distributed by clients. Assume that the client doesn't have source code to your library and that internal data structures aren't exposed to the client.
- The design should allow for any replacement algorithm to be implemented by the client. Please provide the LRU and MRU algorithms as part of your solution.
- **Example use case:** As an in-memory cache on an application server, storing data associated with user id, in order to avoid a database dip for every request.

Submit the design as a PDF.

Implementation

Implement the above design. C# is preferred, but if you are unfamiliar with C#, Java or Python may be used.

Implementation requirements:

- Prioritize correctness, robustness, and extensibility over extra features and optimizations.
- ***Write your code with the quality bar you would use for production code***.

Submit your response as a .zip of a Visual Studio solution (if you're not using C#, as a .zip of your sources with a readme on how to compile and run).

IMPORTANT: Be sure to scrub your submission of any binaries or executable files (e.g. *.exe, *.dll, *.bat, etc.). Our email filter is very sensitive and may silently delete emails with archive attachments containing these file types.

All material in this document is proprietary to The Trade Desk and confidential. Distribution to parties without written consent from The Trade Desk is prohibited. Candidates disclaim all rights to any documents, code, and/or binaries sent to The Trade Desk as a solution to this exercise.