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During our offering of the “Computer Networks” course, we have created a lot of quality content in both theory and labs. This material was used predominantly in a flipped class mode (within IITB) and as MOOC for college student/teacher training (covering 10,000+ people over many years). The content goes hand in hand with some platforms built in-house. The platforms have seen widespread use across departments/institutes (300+ faculty). Our approach has essentially helped reduce instructor load and also scale any course offerings.

Theory:

We have created a multimedia book on computer networks. Much like a textbook, the book is composed of chapters and sections. A section is made of “interactive” videos (videos with embedded quizzes), reference material and auto-graded practice problems.

The above book is hosted on a publishing platform called BodhiTree, which helps instructors to import multimedia books and customize their offering. They can enroll students, discuss material, track their progress etc much like an LMS.

Lab:

The theory goes hand in hand with lab exercises based on wireshark/tcpdump traces; ns3 and socket programming. These labs come with associated auto-graded questions that can be hosted on BodhiTree or SAFE (see below). Instructions cover Windows, Linux and MAC platforms. BodhiTree also comes with an associated desktop application (VLAB app), where in these labs can be performed at the client+server side leveraging docker infrastructure, including support for auto-grading. VLAB is currently a work in progress, while Bodhitree is quite mature.

You can explore the multimedia book and a few sample labs by logging to <https://garuda.bodhi.cse.iitb.ac.in> and clicking on CS224-Computer Networks+Lab (under explore).

Assessment:

In any course, apart from instruction, one also needs to evaluate learning. SAFE is a platform that we use for proctored exams. It is based on BYOD model. Students take their exams on their own phones, yet cannot cheat. SAFE supports many different types of questions, auto-graded objective questions as well as descriptive questions with rubric based manual grading. More details at : <https://safe.cse.iitb.ac.in/>

We have a repository of 400+ simple objective questions in SAFE compliant format that are mainly useful for in-class weekly quizzes. We also have another platform called SQRE (a work-in-progress), a very sophisticated question bank that auto-extracts questions from docs, and exports them in various formats (including SAFE).

Please write to us if you wish to use any of the content or platforms. We are also open for collaboration in this space.