CS224+252: Computer Networks

Course Overview & Logistics

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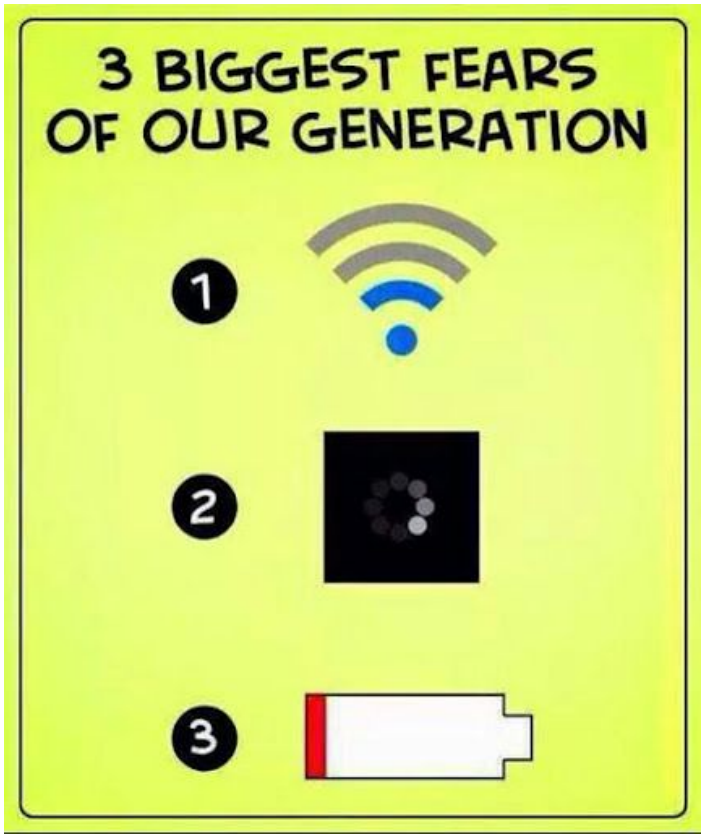
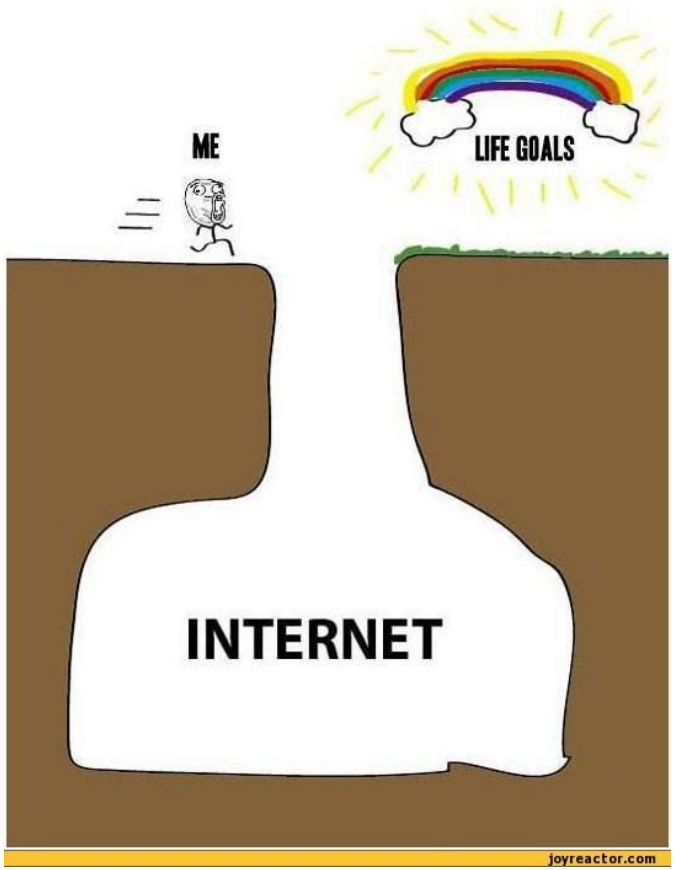
(Course website: flamingo.bodhi.cse.iitb.ac.in)

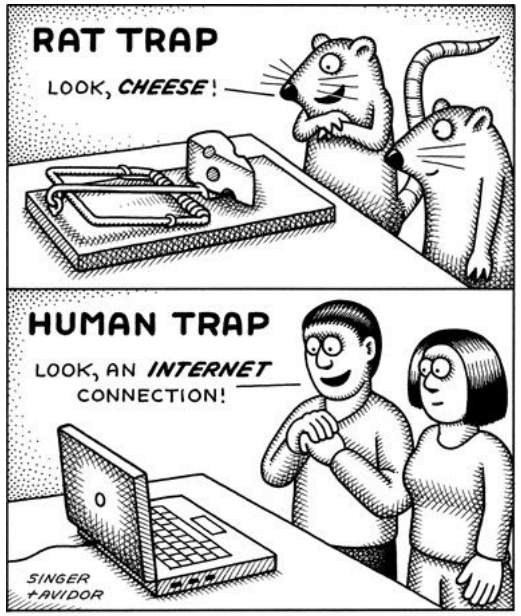
Questions ???

- Computer networks, what is it ?
- Why should I study it?

  https://www.internetlivestats.com/







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Course Contents

Topic No:	Topic Description
1	Course overview and introduction to networks
2	Goals; Internet Protocol Stack (Layering)
3	PHY layer: Theory (Shannon's theorem), Encoding schemes: NRZ, NRZI, Manchester, 4B/5B
4	Link Layer: Framing, Error control, Reliable data transfer, MAC protocols, Ethernet, Switching

Course Contents (continued)

5	Network Layer: Inside a router, IP addressing and forwarding, Routing Protocols (Distance Vector, Link State, BGP), Supporting protocols (ICMP, ARP)
6	Transport Layer: UDP, TCP
7	Application Layer: DNS, Email, Web, Peer-2-Peer

Additional References

- Computer Networks: A Systems Approach; 4th edition by Larry L. Peterson and Bruce S. Davie
- Computer Networking: A Top-Down Approach; 5th edition by James. F. Kurose and keith W. Ross
- Computer Networks; 4th edition by Andrew S. Tanenbaum

CS 224

- Open ONLY for **CSE UG** students
- CS224m is open for other department students

CS 224: Evaluation Plan

Class Participation	4%
Quizzes **	26%
Midsem	30%
Endsem	40%

** Weekly Safe Quizzes: 10% (Best X/Y); 2
Other Proctored Quizzes: 16%

CS 252

- Lab course: Practical implementation/simulation of concepts learnt in CS 224
  - Hands-on feel for computer networks
- 3 hour lab each week, Fri 2-5pm
  - Can have off-lab projects as well
  - Unless otherwise specified, lab work to be done individually

CS 252: Evaluation Plan

- Weekly Labs: 40% (Best X/Y)
- Project: 20%
- Exams: 40%

Lab Logistics

1. Very large class size → Automated grading to large extent
   a. Not all aspects can be auto-graded, please focus on learning and not grades
   b. Grading essentially to motivate you to complete the work, we know you can cheat easily in weekly labs
   c. While it is very tempting to cheat, I urge you to resist the temptation. It is your learning that will suffer.
2. Weekly labs: Take our help; welcome to talk with your friends as well
   a. Discuss anything other than asking the answers!
3. Goal of weekly labs is learning. Grades dictated by large extent by “proctored” exams

Pre-Requisites

- Sincere, hard-working: committed learning
- Time management: methodical learning
- Social (discussion & participation): group learning
- Straightforward, honest: ethical learning
  - Cheating will be reported to DDAC
- A bit of humor, wit will liven the classroom

Course Model

- Flipped Classroom
  - http://en.wikipedia.org/wiki/Flip_teaching

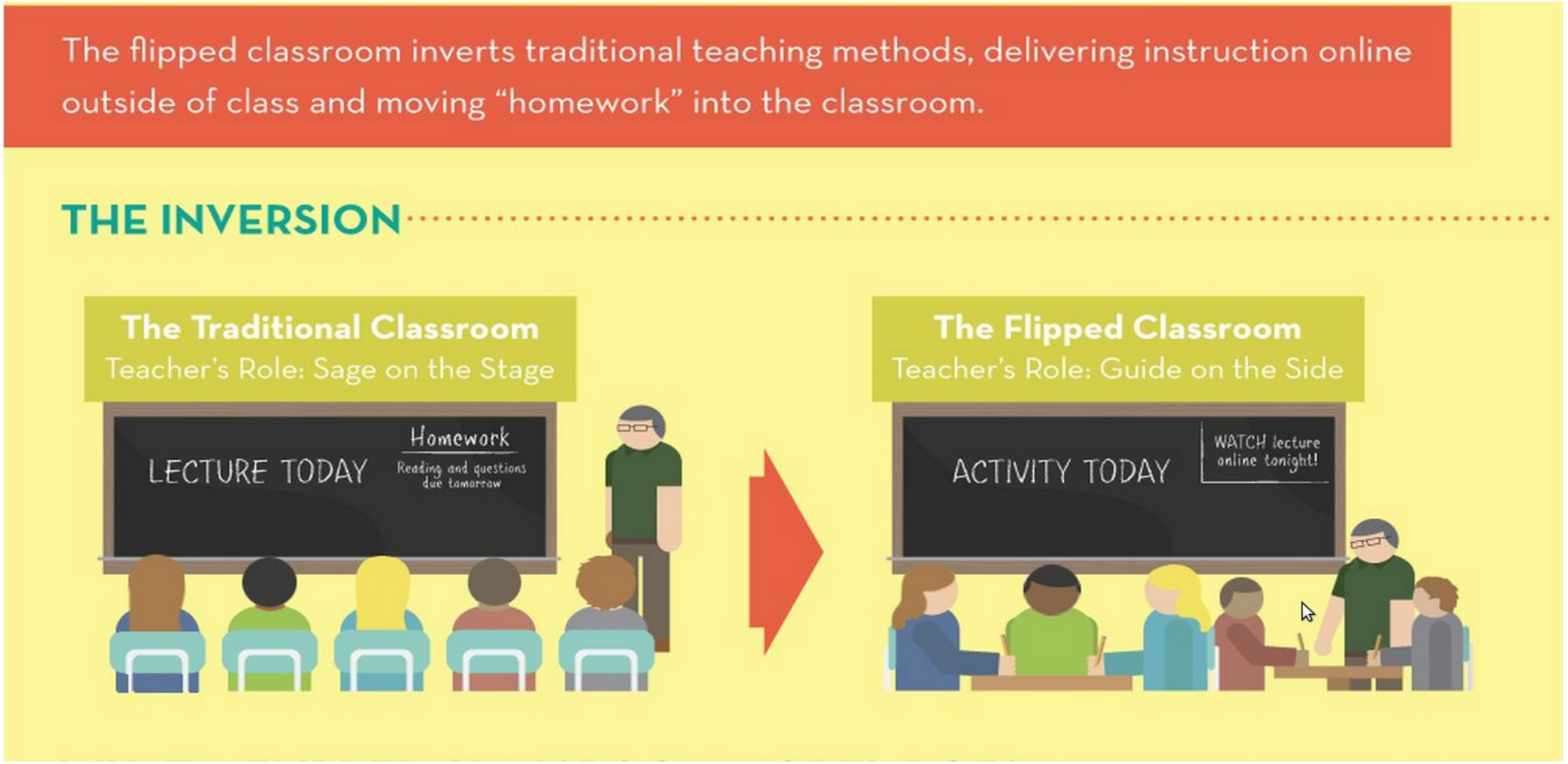


Fig. From http://www.knewton.com/flipped-classroom/

Online Content: Video

- Concepts packed as modules to watch at own pace

- Video based (ppt & blackboard)
  - Typically 10-20 min
- Interactive with embed questions
  - Pause, think, understand, answer
- Total watching time: 1.30 hrs per week
- All reference material provided including slides

- You choose your own
  - Time
  - Place
  - Group
  - Pace

Online Content: Practice Problems

- Concepts and grouped concepts have associated practice problems
  - Work at your own pace and time
- Problems: Multiple choice, Fill-In-Blanks and Descriptive
  - First two are scored online (not for grades, but for your own record)
  - Can potentially cheat but defeats purpose of learning

Tutorial

- Sessions in smaller groups of 60 (3 groups)
- A group meets once a week for 55 min
  - During Slot 3

  (Will share student to day/time shortly)
- **What happens in a tutorial?**

Tutorial

- Introduction: 5 students
- **Simple Quiz** every tutorial for 10 min (accounts for 10% grade)
  - Will be based on SAFE
- Summary/Reiteration of concepts learnt
- Discussions, Clarifications, Q&A session
- Practice problems
- **Attendance? I don't enforce but hopefully SAFE will :-)**

Comparison

- **Traditional Model**
- Fixed Timing/place
- Focus ?
- Watch once
- Instructor pace
- Few questions
- Target few students
- **Immediate feedback**

- **Flipped Model**
- Flexible timing/place
- Focus?
- **Watch many times**
- **Student pace**
- **Many questions**
- **Target all students**
- No immediate feedback

Cons

- No immediate feedback
- Solutions?
  - Watch in groups
  - Leverage discussion forum
    - Post questions, get answers from friends,TAs or Instructor

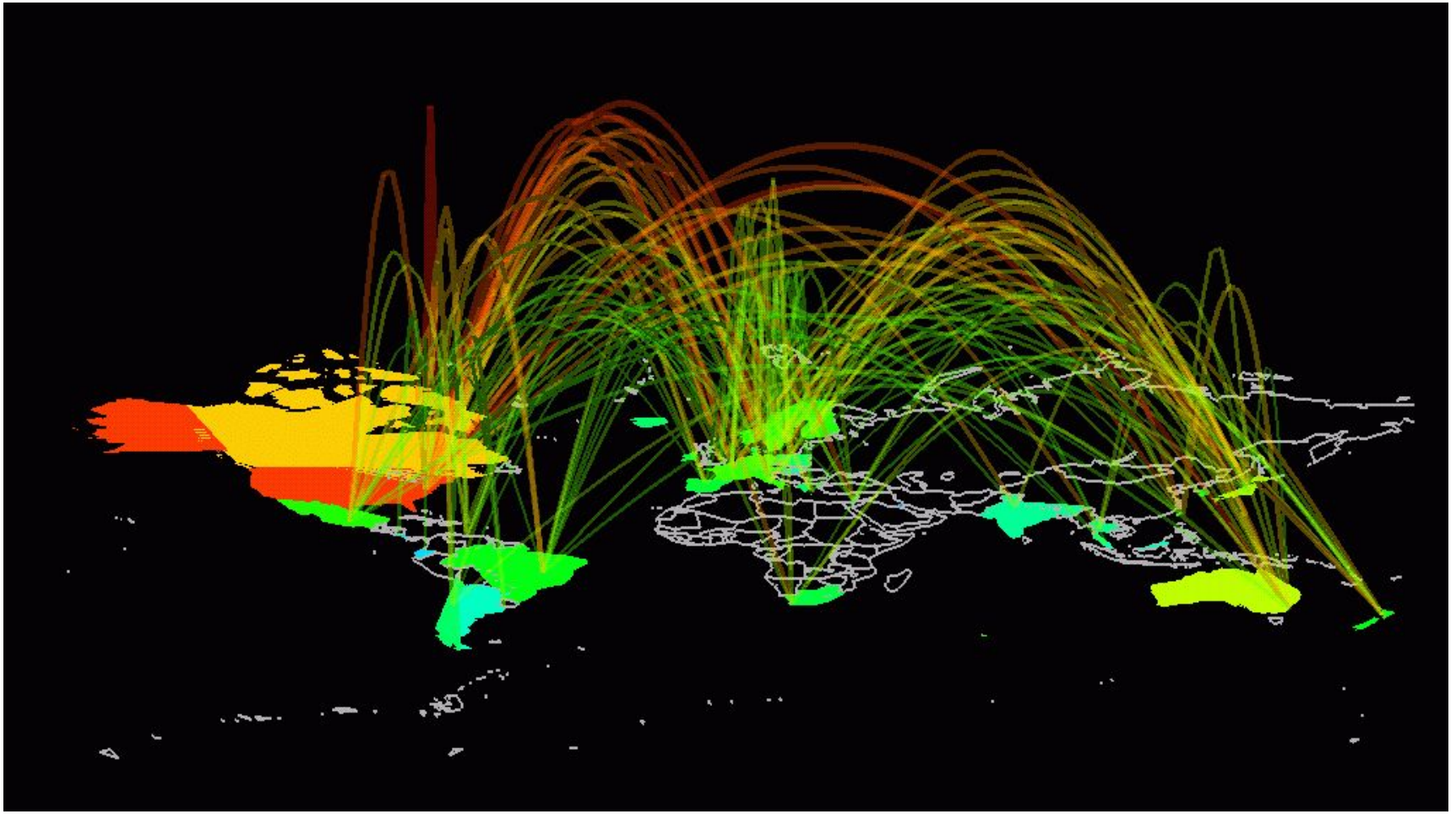
Class Participation

- Earn points based on participation
  - 4% count towards the grade
  - Top 5 contributors will also win a treat :-)
- How to earn points?
  - Bodhitree quiz score; discussion forum participation
  - Submit at least 1 “interesting” question for every tutorial discussion (by 11pm previous day)
  - Submits “**Quality**” practice problems in specified format by end of every month.
    - Will be reviewed and published on Bodhitree for all to practice
    - Practice problems are like the ones asked in midsem/ensem/quizzes
    - Feel free to browse the Internet, but the questions should be in your own words; change the numbers also
    - Beware “plagiarized content” will earn negative points

Action Items

- Look out for emails/messages on teams from me
  - One on Bodhitree and one on SAFE enrollment
- **SSO Login** and watch the videos on BodhiTree
  - Look at the wiki for the schedule of videos to watch for the week
  - Don't take it easy: Tutorials starting Jan 10th
- No Lab first week (need to know some base material)
  - First lab on 14th Jan
- Before first tutorial
    - Prepare for the SAFE quiz during the tutorial
    - Prepare 5 “interesting” questions
    - Prepare practice problems for later submission

Enter the World of Communication Networks



Picture of the Internet, from the Internet