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| **LevelUp – An initiative from PUCSD Alumni 1994 Batch** | |
| **Date:** 21/11/2019 | **Version: 2.0** |
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| **Brief summary:** This document describes the high-level approach and scope for the LevelUp Initiative (WHY & WHAT) and short-term high level plan.  The detailed execution plan to deliver against the scope (HOW & RESOURCES) is not part of this document. | |
| **What we want from PUCSD Faculty:**   * Review & decision on the scope & proposed solutions as outlined in the document. * Logistics support needed - remote secure access, infrastructure to host content. * Access to the Department calendar of Holidays, Examinations etc. to ensure no scheduling conflicts and optimum planning for the students. * Access to the Department curriculum to ensure our topics are complementary. | |

# Introduction

At the very heart of the level-up initiative is a strong desire of the PUCSD Alumni 1994 batch to explore a way to give back to the institution which had given so much to each of us. In the last 20 years there have been several changes in the way the PUCSD department functions with also a certain loss in autonomy. It is our somewhat biased opinion that some of these changes have taken away the uniqueness, creativity and bold experimentation of the department for which it was respected and known.

To translate this strong desire to meaningful intent the first step was to understand where the maximum value could be derived for the faculty and students. With this aim, inputs in the form of a survey and discussions with faculty (both current and ex) were initiated. The survey inputs and an empathy map derived from it is detailed out in Appendix A. These give an indication of the endemic symptoms and their potential root causes.

The rest of the document builds on these inputs and outlines an approach, scope and proposed solutions of where the maximum value will be derived by the students of PUCSD!

# Statement of Intent & Scope

The initiative is complementary to the educational course of the institute and does not intend to replicate the syllabus. In a world of abundance not only will this be unfair to the students but also it does not allow for feedback to channel to the rightful place to fix the root cause. On the other hand we cannot be presumptuous (given the inputs we have received) of the current and up-to-date methods of teaching. Neither does this initiative intend to compete with the placement cell which is responsible for reaching out to the alumni for internships and final job placements, indeed they will continue to do so. Hence the areas of interest in the scope of our initiative are over and above the curriculum of the institute and focus on student readiness for industry or higher education.

What this initiative really intends to do & its scope is the following:-

1. **Industry Exposure & staying current on technology trends:** Bridge the gap between theory (as taught) and industry, i.e. the application of computer science & digital technology to solve real world problems.
2. **Build self-sufficiency:** In the fast-paced evolving landscape in IT, competences & skills become redundant and new competencies & skills need to be developed at a rapid pace. In this world, a learner mindset and a curiosity to learn are more critical than ever. Additionally, the ability to think through independently and with one’s own unique perspective on multiple approaches and problem solving abilities are key to not just surviving but thriving in the real world.
3. **Mentorship & Counselling:** Provide access to mentors from our batch for career & higher education counselling

The proposed solutions against each of these are outlined in the ‘Proposed Solutions’ section below. Ideally each scope item should have an owner and an execution plan – more on this is outlined in the ‘governance’ section.

# Proposed Solutions

1. **Industry Exposure & staying current on technology trends:**
   * **Curate online course**: While the internet is full of high quality material on CS topics, it can be quite overwhelming for someone who is new to CS. I propose that we create a set of curated online lecture material for all the core courses that are being taught now at PUCSD. Given that most of the top CS institutions across the world are making high quality lectures available for free, I don't think this should be difficult. If the detailed course syllabus is made available to us, we could systematically create a curated set of lectures for each of the core courses. To ensure that the students actually go through the curated set of lectures, we could have assignments/problems linked to the lectures with some prizes. While providing this may be good, it needs to be sustainable and keeping this list evergreen can be a quite a job!
   * **Industry Projects on the latest technologies**: Real projects. This is over and above internships which is only for 3rd year students. Perhaps a large scale in-house initiative - that grows every year and we are able to publish and market this product. Internship projects are out-of-scope and should be orchestrated by the placement cell which has a wider reach and the mandate.
   * **Industry Sessions:** on real-world industry problems and how digital technology is used to solve
   * **"Paper" programming**: With the advent of laptops and the internet the ability to craft or design a program on paper is all but lost. To bring back the focus on programming, propose a monthly programming contest. The idea is as follows: 1. At a designated time, students access a link 2. The student is shown the programming problem 3. The student is locked into a full-screen area for writing the program. At this stage nothing else on the computer can be accessed. 4. Once the time runs out the answers are automatically submitted. 5. The best submission will be awarded a prize. Goal here is to encourage the habit of writing a program on paper without any IDE or access to existing code to copy from.
   * **Hackathons**: Code sprints of various kinds
   * **Build research culture:** - introduce new topics. Exposure to academic conferences, critical thinking - analyze published papers.
2. **Build self-sufficiency**
   * **Communicating with clarity & confidence**:Communication is rather a broad area of skill development, hence the scope of this area needs to be further detailed. From the student survey and other inputs the key areas in communication both written and verbal are articulation & confidence i.e. ability to articulate one’s thoughts succinctly and clearly. Demonstrating confidence and conviction behind one’s thoughts even if it means admitting that you are wrong. Solutions may explore external suppliers / start-ups like WordMaya and non-profit organizations like Toastmasters.
   * **Problem Solving**: How easy is it to change ideas into action and positive change? Develop skills to help think about complex issues, interconnected issues & systems; activate deeper thinking towards practical solutions. Combination of sessions & experiential learning
   * **Learning Behaviors**:Combination of mindful learning & continuous learning. How to be relentlessly curious about the world, seeking the lessons to be learned from every experience and interaction. Making time to develop our skills based on internal and external resources, making time to share our skills , knowledge and insights with others and vice versa**.** This should address the ‘motivation’ angle.
   * **Building your Personal Brand**
3. **Mentorship & Counselling**
   * **Establish Mentorship:** Establishing the role of mentor and what can the mentee expect from the mentoring; Assign Mentors
   * **Experience sharing:** Alumni talk about career roadmaps - possibilities and opportunities
4. **General**
   * **Mentoring Placement Cell:** Strengthen the industry connect and pitch. Improve market intelligence on companies and the nature of work they do. Proposed to set up where a couple of industry savvy alumni are involved in bridging this gap.
   * **Monthly Alumni Day :** Start monthly Alumni Day Share couple of videos / Alumni talk about their stories
     + Remote seminars - Technical / non-technical
     + Do Q & A with students
     + Let students demo their project / assignments / speak
     + Focus on a specific course and do a Q&A for keeping motivation
     + Award student of the month
     + Focus on a specific course and do a Q&A for keeping
   * Alumni Engagement
     + Local chapters
     + Global virtual quarterly
     + Yearly - Make Nostalgix a bigger event. Every year a few alumni commit to attend Nostalgix. and a day before this event - we host workshops and student engagement
   * Newsletter: Brief updates and what engagements are in the horizon – Monthly or quarterly with minimum effort.

A high-level overview of the potential solutions with the owners, target audience and indicative start of delivery of engagements is captured in the table below:



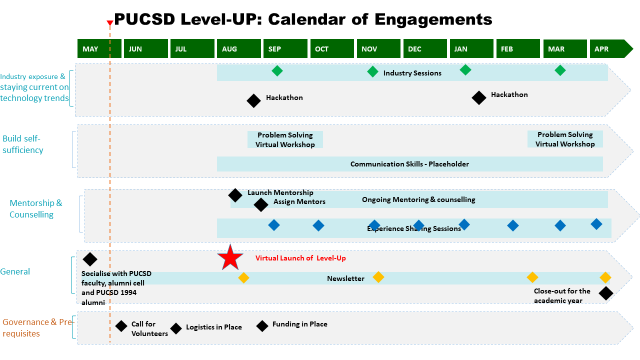
\* Short term: 0~12 month; Medium Term: 12 – 24 months, Long Term : 24 months +

# Out-of-Scope

There are also certain areas where we recognize there may be some deficiency but we are considering it out-of-scope as it may be perceived as interfering or just may not be in our sphere of influence. These are documented for reference below:-

* **Quality of Permanent staff:** The department still lacks a permanent HOD and several faculty for core CS topics. Impact of this is obviously high as it has a direct bearing on the quality of teaching. All we can do in this initiative is to broadcast to alumni connections in the industry that a position is open but to take over anything more than this is not wise. If we do think of bringing this back to scope then limit the solution to attracting talent only. Selection etc cannot and should not be the remit here.
* **Student Selection Criteria:** The selection approach is not completely merit-based. About 50% is based on quotas/reservations (merit based within that ofcourse). Hence the motivation of the students may not be a love for Computer Science but driven more from an economic betterment. While getting a job is not a bad goal to have, it is important to have a basic interest in any subject in which you want to make a career. Despite the strong feelings we may have on the selection criteria we are limited to influence here.
* **PUCSD Branding**
* **Curriculum Improvement & Tutoring**
* **Periodical/ Magazine:** Electronic and paper format. Frequency to be determined. Content can include - links to monthly video, articles from Alumni, programming challenges or other comp-science contests, algorithmic insights, history about (PUCSD, alumni, teachers) and fun section

# High-Level Calendar of Engagements



# Governance

Work in progress - some broad areas to be covered are listed below

* Role of a topic / scope area owner:
  + Shaping of the topic
  + Execution
  + Leverage the wider alumni community as required – ideally via the placement cell.
* Administrative roles needed to run the initiative – Treasurer, Chair or secretary, Liaison with Faculty & Placement Cell, Liaison with Alumni of Batch of 94 etc.
* How do we work along with Alumni Cell – close partnership – use their databases, reach to other alumni etc. Send out our newsletters
* Continuous improvement Feedback loop on the entire initiative.
* We need a platform on which we can host this initiative – technical!
* Well-established periodic feedback loop with the faculty
* Volunteering – how do we get alumni to volunteer and commit. While this is primarily being orchestrated by us, batch of 94, we should at an appropriate point reach out for other year Alumni for volunteers. Many are based in Pune and many others could also play a critical role in mentoring, guest lectures, placements etc.
* Funding – The whole framework with transparency

# Key Success Factors

Work In Progress

* PUCSD blessing to proceed on our intent and scope.
* Commitment to see this this entire process through with all its challenges
* Participation from the alumni, present students and faculty
* Established and open feedback loop with the faculty. Lessons learned from the industry projects for e.g. should be shared with the faculty to drive continuous improvement or where working well to maintain as best practice
* Tracking outcomes

# Industry Sessions: Detailed Content & Execution Plan [Owner: Archana & Mittal]

**Content:-**

Real-world industry problems and how digital technology is used to solve

**Execution Plan:-**

* Plan for a monthly session – First Friday of every month. Friday evening in India, Friday morning in the US.
* Industries
  + Finance – [ ( Intuit, Anil Madan) ]
  + Creative – [ (Adobe, TBD) ]
  + Banking -
  + Entertainment – [ (Netflix, TBD) ]
  + E-commerce – [ (Indian company in e-commerce), TBD ]
  + Lifestyle – [(Uber/Airbnb)
  + Social media – [ Facebook
* Deliver over zoom – Keep a 45 min session, with about 25-30 min talk /presentation, 15-20 min Q&A

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# Hackathon: Detailed Content & Execution Plan [Owner: Kiran & Krishnan]

Hackathons are group activities for programmers to design ideas through collaboration and implement them fast together on premises. Usually, carried out over non-stop 24-48 hour windows working round the clock.

For now, we will adapt to the virtual-hackathon model which is individual skill development.

**Goals**

* To improve programming skills and unit testing skills
* To learn how to collaborate and brainstorm together on complex problems
* To learn how to plan, design and integrate different software components together within a stipulated period of time

The hackathon program at PUCSD consists of the following elements:

**Hackathon platform**

* Need to finalize a hackathon platform for delivering the hackathons in a sustainable way on a regular basis
* Selected platform needs to have the following features:
  + Ability to schedule in advance the start and end of a hackathon
  + Support for three distinct groups - organizers, participants and assessors
  + Automated verification of coding challenges

**Programming language/technology**

* Start with only 1 programming language to keep things simple
* Add more programming languages/technologies later on based on feedback and engagement levels
* How do we decide on the programming language ?
  + Go with Python as this is the most popular one and adds value to resume
  + Ask department faculty on what is the most commonly used programming language used by students

**Frequency & Duration**

* On weekends for 48 hours from 12:00 am Saturday to 11:59 pm Sunday
* Two factors need to be kept in mind while deciding the nature and content of the hackathons
  + We do not have first hand information about the technical competencies of the students
  + The initial set of assignments need to be at a reasonable level so that even average and below average students stay interested.
* The idea is to start with a set of individual programming problems and then, depending on the feedback and engagement levels, include group projects that are the norm in conventional hackathons.
* Frequency for individual programming assignments - Every weekend [too much - 150 people, excitement-factor]
* Frequency of group assignments - Once in a month culminating in a weekend
* Timeline
  + Start in August with individual assignments for 6-8 weeks
  + Start with group projects from mid-Sept/October

**Evaluation**

* Will consist of multiple checkpoints
* Checkpoint 1
  + Use automatic verification features of platform to check if the programs are producing the correct output
  + Submissions that pass this checkpoint are sent to the next checkpoint
* Checkpoint 2
  + Leverage our alumni for
    - Providing code review comments for working programs
    - Providing a live mentoring session to the authors of the working programs

**Pipe for hackathon content**

* Important to build a pipe of appropriate topics for the hackathon at the start so that it can be sustained
* Reach out to our alumni network for building this pipe
* Initial targets
  + Individual assignments: 15 assignments with increasing difficulty levels
  + Group projects:  6 projects

**Incentives**

* To sustain the interest levels in the hackathons, here are a few possible ways to incentivise the participants
  + Monetary rewards
  + LinkedIn recommendations/endorsement
  + Opportunity for top 3 programmers to present their design to the department
  + Certificates by departments

**Feedback**

* Optionally: to benefit a participant further some feedback on the code can be provided for the purpose of improvement

**Miscellaneous items/Mode of operation**

* Students will be expected to submit their assignments along with unit and system level tests
* Every hackathon challenge will be launched every Friday even via a teaser video from an alumni that describes the challenge and the expectations. The details of the challenge will only be available only on 12:00 am Saturday.
* Hackathon is open to students from all years (?) → after 2nd year (? level is different, keep first semester out.). Students are local residents - effort.
* Guidelines for the coaches on how to review.

**Challenges**

* Group projects may not be feasible until students return to the department as it may be quite challenging for students to work remotely on a group project.
* Funding required for using a hackathon platform
* Preventing students from copying code from the internet (oral viva ?)
* Feedback is useful but needs alumni time commitment and may overlap with the mentor program [don’t combine]. Should we allow them to speak to Alumni for advice while the hackathon is active.

# Communication: Detailed Content & Execution Plan [Owner: Sriram & Mittal]

<Sriram & Mittal please add>

# Problem Solving: Detailed Content & Execution Plan [Owner: Kavita & Sriram]

**Content:-** How easy is it to change ideas into action and positive change? Develop skills to help think about complex issues, interconnected issues & systems; activate deeper thinking towards practical solutions. The session will help build the capacity to think and mental models to apply. This is a life-skill topic.

**Execution Plan:-**

* Finalize content
* Review content with Faculty and 1~2 chosen alumni
* Delivery of content will be virtual interactive over 2~3 session of an 1.5 hours.
* We may need experiential learning to apply - this will be later, to start with it will be sessions and interactive problem solving
* Establish feedback loop with students to improve content

# Mentoring & Counselling : Detailed Content & Execution Plan [Owner: Archana & Kavita]

**Content:-**

* **Establish Mentorship:** Establishing the role of mentor and what can the mentee expect from the mentoring; Assign Mentors
* **Experience sharing:** Alumni talk about career roadmaps - possibilities and opportunities

**Execution Plan:-**

* Pitch in the idea to various groups.
  + Virtual conf call with Bay Area alumni
  + Virtual conf call with PUCSD94 batch
  + Tell about the 8 available time slots in a month
* Required engagement
  + 1 hr a month.
  + Two out of 8 time slot chosen by the mentor
  + Short profile required
* Ask Alumni to sign up as a Volunteer – Mentor (GoogleForm)
  + If they sign up, specify 2, 30 min time slots when available in a month.
* Once we have about 10 mentors (This number is flexible, but I guess 10 is a must)
  + Ask students to sign up for mentoring, for first 10\*2 students only. (GoogleForm)
  + Personal statement and what you are looking for mentor is required.
  + Ask to choose one of the available 8 time slots.
* Create Google calendar invites, using Google Meet for mentors and mentees for one 6 calls each student. One call per month.
* Ask them to fill a survey at the end of 6 month engagement

# Mentoring Placement Cell: Detailed Content & Execution Plan [Owner: Sriram & Kavita]

<Sriram & Kavita please add>

# APPENDIX A

In Feb 2009 a survey was initiated (by Archana Jain) with the PUCSD students. The link to the survey is <https://forms.gle/PPUp9BAVpwbEH2sJ7>. Of a potential 100+ students only 19 students filled the survey. Regardless the feedback was illuminating. Below are the observations:-

**Observations from Student Survey:**

|  |  |  |
| --- | --- | --- |
| S.No | **Observations** | **Possible conclusion** |
| 1 | Out of all students only 19 replied. | It is hard to convince students to do anything, so we will need to assume that in any initiative the participation will be small to start with. We will have to either throw carrots or have friends convince friends to come. |
| 2 | 13/19 are not local students, 6 are local | May be local students are not even making effort to fill the form. Some local students are not spending lot of time in department and thus not receptive to things like these requests. |
| 3 | Most students like problem solving, would like to do innovation, like Math. 2 / 19 landed because this was the only department available. | They would love some problem solving challenges. Majority will be interested, but don't expect 100%. |
| 4 | Almost everyone had medium of education in Bachelors in English. 1/19 chose marathi, but his communication is ok, he reads english books. | Medium of communication as English is not an issue for videos, tutorials, Q&A sessions, text books. |
| 5 | Some have really poor writing and most likely speaking english, but there is motivation because they are from very poor families. | Need some cheerleading for these students who are really interested in improving communication, by providing safe environments to practice. |
| 6 | There is less help from seniors or other classmates when it comes to working on assignments. | Need to bring some incentives for seniors to help juniors. |
| 7 | Most online tutorials done by students are for interview prep only. | There is hardly anytime left after working on subject assignments, so students are only doing online tutorials when super critical, like interviews. We will need to weave in long term projects as electives built into the course. |
| 8 | Buring questions | a) What type of work does companies do? |
|  |  | b) How to land in a good job / internship? |
|  |  | c) In CS, we have multiple domains, how to decide which one to choose? |
|  |  | d) Do I need to move out of India? |
|  |  | e) Why people think that if u are not placed in any company then you are not doing anything in academic year? |
|  |  | f) What's the purpose of human existence?, Can we ever imitate human brain with AI, that way can we live forever? |
|  |  | g) Though I am studying os but it's still so difficult to see it as a whole picture and it is hard to connect all dots. |
|  |  | h) I think in master degree ,need only one specialization subjects means result like you complete master degree with specialization (sub name) . |
|  |  | 1)How things work and how people thought about implemting something? 2)Advancement is good but till what level? 3)How secure is our data even after data encryption and privacy? |
|  |  | j) Is CS only for people whoes mind work very fast? |

**Empathy Map:**

|  |  |  |  |
| --- | --- | --- | --- |
| **What do they believe in** | **What are they saying** | **What are they doing** | **What are they feeling** |
|  |  |  |  |
| Landing in a job is most important | "We need direction" | Asking for mentorship | Disappointed by herself |
| CS gets money | "I am hesitant to ask questions in English" |  |  |
| There are opportunities for innovation in CS | "How can I explain to someone that I am right" |  |  |
|  | "I like solving problems, using my brain, doing something innovative" | The AV room can project screen content with Audio, but interactive sessions will require an audio / mike system, which is not present. |  |

# APPENDIX B

Syllabus of PUCSD – MCA course – The list below is incomplete, we need to get th latest from Patil sir

1. Artificial Intelligence,
2. Operational Research,
3. Software Development Concurrent Programming,
4. Formal Methods,
5. Quantum Computing,
6. Abstract Data Techniques Data Structures,
7. Computer Networking,
8. Algorithms,
9. System Programming,
10. Operating System,
11. Theoretical Computer Science
12. PUGOFER,
13. Computer Organisations,
14. Database Management Sytem,
15. Numerical Methods