Research Plan (Draft Week 1) for CSE3000 Research Project
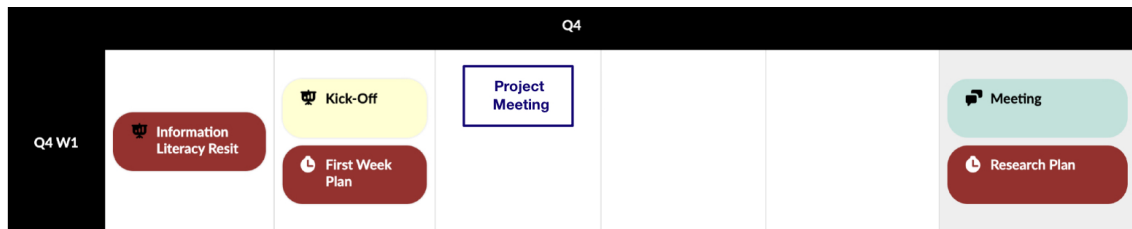## *Using Weighted Voting to Accelerate Blockchain Consensus*

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April 23, 2024

Planning of the research project

Note that the "Project Meeting" is a weekly meeting together with the supervisor, responsible professor and peers to discuss project advancements and provide/receive feedback.


WEEK 1

1. Read the following papers:

   - PBFT: Practical Byzantine Fault Tolerance [3]
   - AWARE: Adaptive wide-area replication for fast and resilient Byzantine consensus[2]
   - WHEAT [1]
   - State Machine Replication [5]
   - HotStuff: BFT consensus with linearity and responsiveness[6]
   - DAMYSUS: streamlined BFT consensus leveraging trusted components [4]

2. During the *weekly Supervisor Meeting* discuss understanding of AWARE.

3. Analyse the research conducted in the area and on the topic of the **Research Question** and identify around 10 most relevant papers.

4. Scan the identified papers and choose 3-5 most relevant to base the research on and study them thoroughly.

5. Understand the background of the research and identify the limitations imposed by each of the existing papers.

6. Write the final Research Plan.
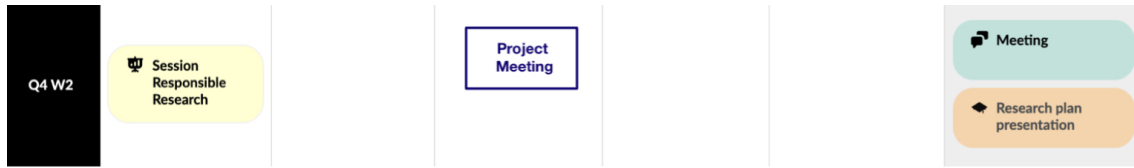
WEEK 2

1. Write the **Background** and **Problem description** sections of the paper.

2. Start sketching the **Idea of improvement** and steps towards answering the **Research Question** and discuss it with the supervisor.
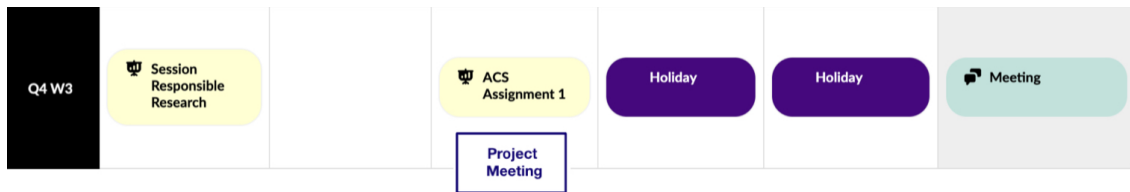
WEEK 3

1. Get accustomed with the code base and find ways to adapt to it to own **Research Question**.

2. Finalise Draft of the contributions to the research and plan the coding steps to conduct the desired experiments.

3. Start writing the code.
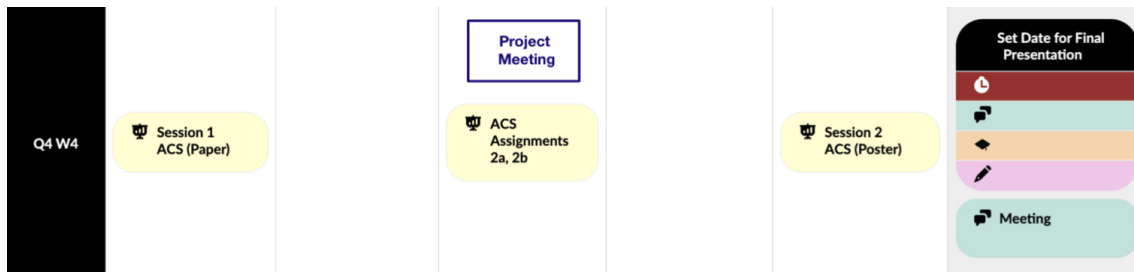
WEEK 4

1. Get a working version of the algorithm and start the **Experiment phase** to gather data (such as illustrations, pictures, comparison with existent system performances).

2. Draw conclusions from the results that the algorithm yields.

3. Write a draft for the **Abstract** and **Introduction** sections of the paper.

4. Prepare Midterm presentation and poster.

WEEK 5

1. Write **Responsible Research** section of the paper.

2. Incorporate the feedback received from the Midterm presentation.

3. Tweak the algorithm to get the final results of the **Experiment phase**.
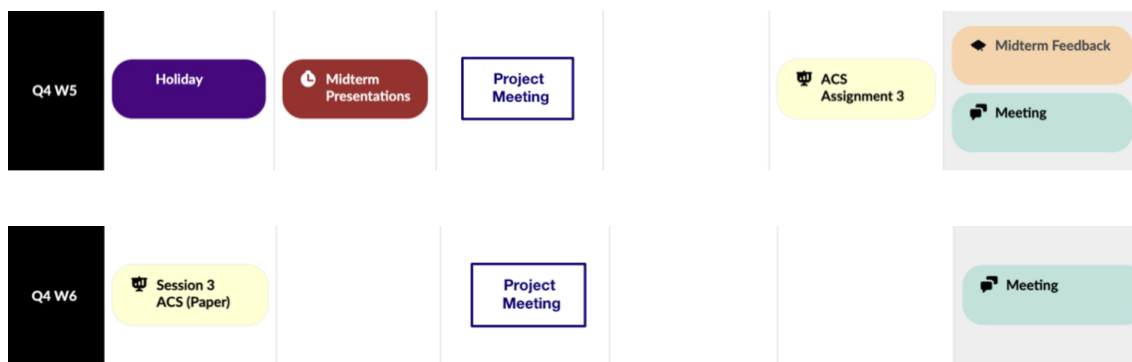
WEEK 6

1. Finalise the **Experiment phase** and gather all data in the form of graphical illustrations to be used in the paper.

2. Structure presentation of results and get feedback on it, together with the supporting illustrations.

3. Finalise **Abstract** and **Introduction** sections.

4. Write the **Experimental setup** and **Results** sections.
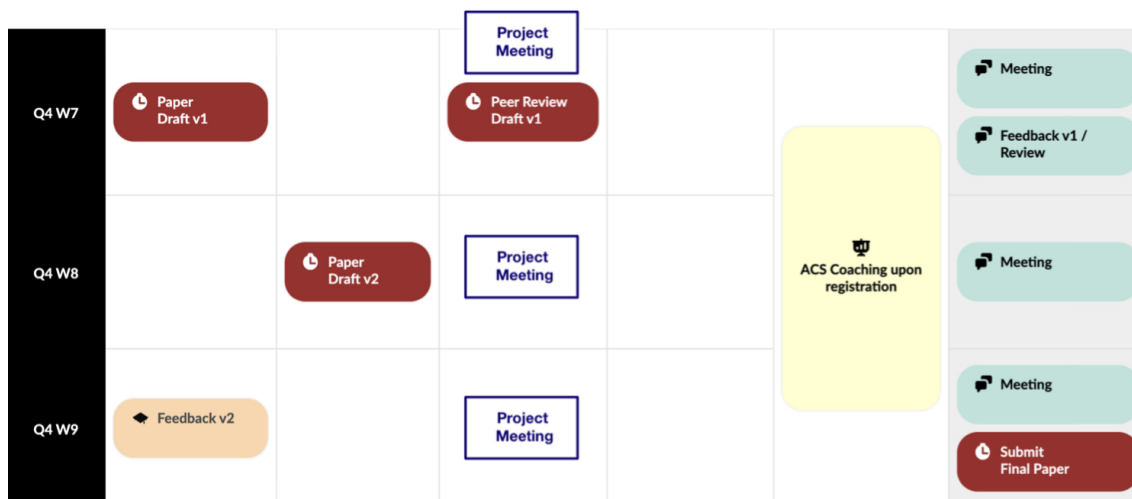
WEEK 7

1. Review papers, write feedback and analyse the relation of its content to own **Research Question**.

2. Write **Discussion** section based on the results presented in the reviewed paper.

WEEK 8

1. Write the **Conclusion** and **Future work** sections of the paper.

2. Revise the **Abstract** in relation to the completed paper to make sure it's comprehensive enough, concise and precise.

3. Check the paper and complete all the sections such that the finished version of the paper is submitted.

4. Discuss at the meeting possible improvements.

WEEK 9

1. Modify the paper based on received feedback.

2. Proofread the paper a couple of times and verify the **References** section.

3. Prepare Final presentation and poster.

4. Get feedback on the presentation derivables from peers and adapt them based on it.
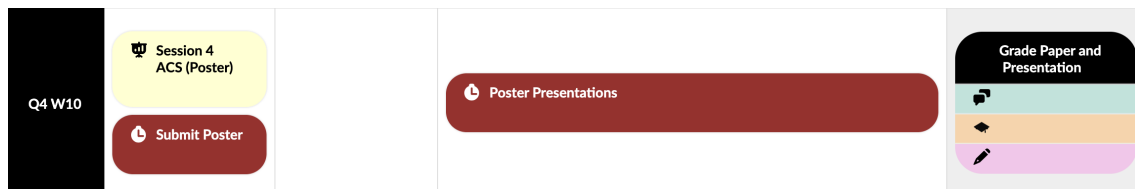
References

[1] Christian Berger, Hans P Reiser, and Alysson Bessani. "Making reads in BFT state machine replication fast, linearizable, and live". In: *2021 40th International Symposium on Reliable Distributed Systems (SRDS)*. IEEE. 2021, pp. 1–12.

[2] Christian Berger et al. "AWARE: Adaptive wide-area replication for fast and resilient Byzantine consensus". In: *IEEE Transactions on Dependable and Secure Computing* 19.3 (2020), pp. 1605–1620.

[3] Miguel Castro, Barbara Liskov, et al. "Practical byzantine fault tolerance". In: *OsDI*. Vol. 99. 1999. 1999, pp. 173–186.

[4] Jérémie Decouchant et al. "DAMYSUS: streamlined BFT consensus leveraging trusted components". In: *Proceedings of the Seventeenth European Conference on Computer Systems*. 2022, pp. 1–16.

[5] Fred B Schneider. "Implementing fault-tolerant services using the state machine approach: A tutorial". In: *ACM Computing Surveys (CSUR)* 22.4 (1990), pp. 299–319.

[6] Maofan Yin et al. "HotStuff: BFT consensus with linearity and responsiveness". In: *Proceedings of the 2019 ACM Symposium on Principles of Distributed Computing*. 2019, pp. 347–356.