

## Practical Task 9.2

(Credit Task)

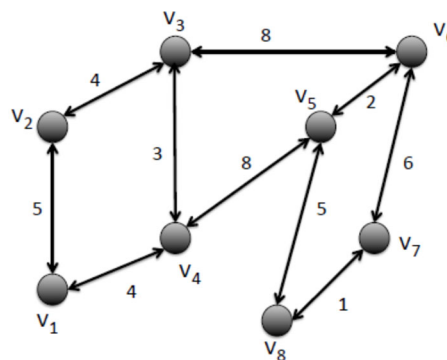
Submission deadline: 10:00am Monday, September 23

Discussion deadline: 10:00am Saturday, September 28

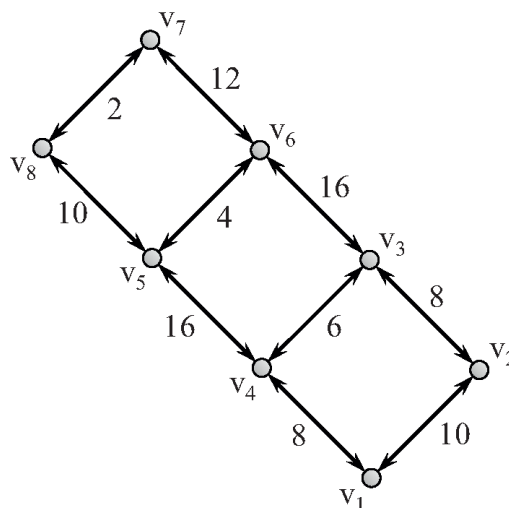
### General Instructions

In this task, answer all the following questions and complement each answer with a detailed explanation.

1. Conduct a small research on the minimum spanning tree problem and efficient algorithms to solve it. You can find all required details in chapter 14.7 of the course book "Data Structures and Algorithms in Java". Learn how to solve the problem via the two particular solution techniques, Prim-Jarnik's and Kruskal's algorithms, described, respectively, in sections 14.7.1 and 14.7.2 of the book. You may of course explore and refer to any other resources covering this topic. We expect you to grasp the idea and important facts about the problem as well as the runtime complexity, implementation issues, and advantage(s) of each of the two algorithms. As the result of your study, you must be able to explain the both algorithms and how they work.
2. Solve the following numeric example. For the given undirected (bi-directed) graph, compute a minimum spanning tree using Prim-Jarnik's algorithm. Show the structure of your partial minimum spanning tree after each edge insertion and indicate for each edge whether it is included in the minimum spanning tree.



3. Solve the following numeric example. For the given undirected (bi-directed) graph, compute a minimum spanning tree using Kruskal's algorithm. Show the structure of your partial minimum spanning tree after each edge insertion and indicate for each edge whether it is included in the minimum spanning tree.



## Further Notes

- You will learn how to complete this task by reading chapter 14.7, and in particular sections 14.7.1 and 14.7.2, of the course book “Data Structures and Algorithms in Java” by Michael T. Goodrich, Irvine Roberto Tamassia, and Michael H. Goldwasser (2014). You may access the book on-line for free from the reading list application in CloudDeakin available in Resources → Additional Course Resources → Resources on Algorithms and Data Structures → Course Book: Data structures and algorithms in Java.

## Marking Process and Discussion

To get this task completed, you must finish the following steps strictly on time:

- Submit your answers to the task via OnTrack submission system. You may submit a hand-written and then scanned document, but ensure that the text is very clear to read. Note that this is a **theoretical task, thus we do not expect you to write any program code.**
- Meet with your marking tutor to explain your solutions. When the solutions are hand-written, do not forget to bring them with you. Cloud students must record a short video explaining their work and use a sort of white-board, e.g. a graphical editor, or a scanned document with the answers.
- Answer all additional (theoretical) questions that your tutor may ask you. Questions are likely to cover lecture notes, so attending (or watching) lectures should help you with this compulsory interview part. Please, come prepared so that the class time is used efficiently and fairly for all the students in it. You should start your interview as soon as possible as if your answers are wrong, you may have to pass another interview, still before the deadline. Use available attempts properly.

Note that we will not check your solution after the submission deadline and will not discuss it after the discussion deadline. If you fail one of the deadlines, you fail this task that may impact your performance and your final grade in the unit. Unless extended for all students, the deadlines are strict to guarantee smooth and on-time work through the unit.

Remember that this is your responsibility to keep track of your progress in the unit that includes checking which tasks have been marked as completed in the OnTrack system by your marking tutor, and which are still to be finalised. When marking you at the end of the unit, we will solely rely on the records of the OnTrack system and feedback provided by your tutor about your overall progress and quality of your solutions.