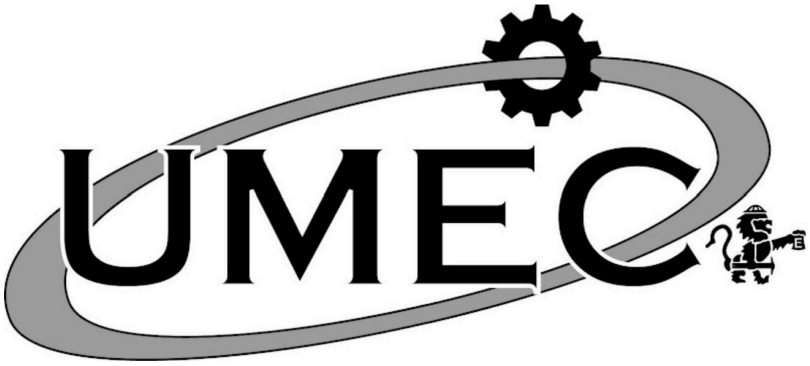

UMEC Programming Competition 2025

Overview

Every year UMES hosts UMEC, an engineering competition where participants can compete to advance to the Western Engineering Competition (hosted by University of Alberta in Edmonton, AB). Placing in the top 2 in a category at WEC allows progression to the Canadian Engineering Competition (hosted by Université du Québec à Trois Rivières in Trois Rivières, QC).

The competition categories are:

- Re-Engineering
- Innovative Design
- Communication
- Senior Design
- Junior Design
- Consulting
- Programming
- Impromptu Debate

The goal of the Programming categories is for teams to use software development to solve a real-world problem, and present their solution to competition judges for evaluation on technical writing, presentation, and the application of the solution. The industries that the technical challenge may focus on include but are not limited to finance, health, transportation, manufacturing, or construction.

Schedule

UMEC Programming Schedule	
⏲ Time	⌨ Activity
08:00am	Competition prompt presented to the competitors
08:30am-02:30pm	Teams work on their solutions
02:30pm	Teams submit their solutions
03:30pm-04:30pm	Presentations to the judges (10 min pres., 5 min question period)
04:50pm	Deliberations start
05:10pm	Winner announced, feedback forms are distributed

The room allocations are as follows:

E2-105	Programming briefing room/director room/judge room
E2-110	PleaseCompile
E2-125	Can't think of name
E2-130	Bison Algorithms
E2-150	Merge Conflicts

Challenge Details

It’s no secret that emergency responders in our province can get overwhelmed with the volume of requests that they receive. They have limited resources to respond to emergencies of various priorities that can happen anytime, anywhere, and it can get extremely hectic to coordinate.

After a heinous arson attack that destroyed 5 apartment buildings, left thousands injured, and occupied police forces for a week to look for the culprit, it was clear that the system needs to be changed. That’s where you come in. You were hired by the government to create a system that can systematically assign fleets to where they’re needed, and analyze the current arrangement of emergency forces to determine what the most efficient placement of the fleets would be.

You will be given a simulation of three day’s worth of emergency requests. Each request has a priority, which corresponds to how much time they can wait for responders before the request fails. Each failed request is two points off. Each extra minute that a request has when a response arrives is one point.

The city is a 200x200 pixel grid, with fire stations, police stations, and hospitals scattered around. Emergencies can happen at any point in the grid with varying (but unknown) probabilities. Firefighters can respond to fire and medical emergencies. Paramedics can respond to medical and police emergencies. Police can respond only to police emergencies.

In this challenge, you must:

- Find the most efficient response for each emergency that occurs, given the needs and times required and the available resources at the relevant stations.
- Re-form the arrangement of the stations so that they address the needs of the city most efficiently.
- Present your findings to the government (i.e. competition judges).

You may also:

- Generate a visualization of the city's organization and the emergency responses

Presentation Details

Teams will be asked (in a predetermined randomized order) to present their solutions to the judges. The judges come from a variety of backgrounds and industries.

They will assess the teams based on the following criteria:

- Problem solving ability
- Proposed solution
- Communication skills
- Team dynamic

Teams will be provided with a computer and projector to use at their discretion.

Rules

Competition Rules

- Teams are made up of 2-4 members
- Solutions and presentations must be submitted at or prior to 2:30pm, to the competition director at awanf1@myumanitoba.ca.
- Teams cannot switch their presentation order, unless there is an emergency
- Any programming language may be used
- External resources are allowed, but they must be cited in the submission and presentation. External code may be scrutinized more carefully.

Presentation Rules

- Teams have a maximum of 10 minutes to present their solutions.
- Judges can ask questions at any point during the presentation, for which the time will be paused
- Presentations will be followed by a 5 minute question period.

- A countdown timer will be provided, and teams will be given warning during the 5 and 1 minute marks.
- All team members must be present for the presentation

Provided Resources

- Papers, pens, whiteboard
- Github repository containing:
    - Competition details
    - Emergencies in the city (csv file)
    - Starter code
- Computer and projector for the presentation portion
- A competition director to answer any questions
    - Fiona Awan, awanf1@myumanitoba.ca, 431-554-9404, E2-105

This is the repository: finona4/UMEC_Programming_2025

Marking Scheme

Presentation	• Design process • Design justification • Critique of the design • Presentation delivery	**20%**
Strategy/Algorithm	• Simplicity • Ingenuity • Ability to achieve desired outcome	**40%**
Code	• Structure • Readability • Code efficiency	**30%**
Resource Management	• Attention to these details: ○ Memory usage efficiency ○ Program's CPU usage	**10%**
Total		**100%**