Post-Mortem
Midterm 1
October, 2017

In addition to the ones provided for assignments, we also publish post-mortems for each midterm after it has been graded. Here is a list of common errors provided by the graders for midterm 1.

General

- Many students worked on the midterm from front to back without looking at all of the questions first. It would help to start with the easiest questions first.
- Some students used nested \texttt{and} expressions when a single \texttt{and} would suffice (same for \texttt{or}).
- Some students did not take advantage of ordering their conditions to reduce the amount of checking they had to do for later conditions.
- Some students wrote question/answer pairs that would never be evaluated.
- Some students started a new cond expression in the associated answer of an else condition.
- Many students misused \texttt{and} and \texttt{or} expressions especially when dealing with complicated nested expressions.

Question 1

- Some students used \texttt{Nat} or \texttt{Int} in their contract instead of \texttt{Num}.
- Some students changed the names of the given parameters.
- Some students wrote mathematically equivalent functions that were not exact translations of the function.
- Many students did not have a correct requires section. There should have been a lower bound on \( m \) (either \( m \geq 0 \) or \( m > 0 \) was accepted), an upper bound of \( v < c \) and a lower bound on \( v \) (any of \( v > -c \), \( v > 0 \), or \( v \geq 0 \) was accepted). Some students put a complex computation in the requires section, which is incorrect.

Question 2a

- Most students did not produce false if no goods were purchased. Note that the contract of the function did specify that goods could be 0.
- Many students did not consider the boundary case for a duration of exactly 48 hours.
Question 2b

• Many students used an outer or expression that would not properly handle the ‘ambassador and ‘diplomat cases.

• Many students had unnecessary code complexity when evaluating the alcohol? parameter. Instead of using the parameter directly as a boolean value, students used boolean=?, equal? or tried to use (alcohol? ...) as a function.

Question 3a

• Many students considered a point to be on a boundary if either its x or y coordinate was equal to one of the box’s edges. In many cases, the other coordinate must be considered too.

• A few students tried to use abs in their implementations. Almost all of these approaches were incorrect.

• Some students only considered two of the x/y boundaries when all four need to be accounted for.

Question 3bc

• Many people did not realize that test cases are required for each edge of the box and for four points outside of it. Even if an else case produced ‘outside, properly testing the ‘inside or ‘boundary components would require considering each way in which those components could be false. Similarly, looking at the boundary conditions in the comparisons would generate test cases for each of the boundaries.

• For Q3c, a few students wrote a test that did not correspond to any of the cases they made in Q3b.

Question 4

• Many students simplified multiple expressions at the same time (like substituting all constants at once).

• Some students substituted the body of mdist before all of its arguments were simplified values.

• Many students did not always simplify the leftmost simplifiable expression.

• In Q4b, many students replaced all identifiers by values in one step, instead of one at a time.

• In Q4d, many students performed substitution on y2 or (+ 3 a) before computing (posn-x (make-posn 7 3)).

• In Q4e, some students simplified their first condition to “[false]”.

Question 5ab

• Some students included their structure name inside the brackets for their structure’s fields.

• Many students tried to use make-packet in their define-struct.

• Many students’ contracts allowed for the spacing or quantity to be 0, both of which could cause problems in later sub-problems.

• Some students used incorrect data definition syntax.
Question 5cd

- Many students’ purposes did not specify what is produced in the event of a tie.
- Many students’ purposes did not include their parameter names.
- Some students produced strings or symbols instead of producing Packets.

Question 5e

- Some students compared two identical Packets, which does not reveal anything about what the function does.
- Many students did not check the “tie” case.

Question 5f

- Many students missed adding floor to the calculation of (/ row-length (packet-spacing seed)) to get an integer number of seeds.
- Dividing the length by spacing gives the number of seeds needed, but doesn’t include a seed for the very end of the row. This is commonly called an off-by-one error.