EML2322L – MAE Design and Manufacturing Laboratory

DR2 Comprehension Quiz (Spring 2019)

Please review the **new DRT** and answer the following questions related to DR2:

1. If the winning ideas from each decision matrix do not appear compatible, groups must brainstorm modifications to the designs that allow them to work together. T / F

2. If after investing significant effort a solution cannot be found, groups must explain why in the report body and can select any other idea(s). T / F

3. Groups begin with the _____ _____ matrix.

4. Groups are required to use the provided _____ _____ template.

5. Which of the following must be included for a correct objective justification?
   a. definition of the objective being evaluated
   b. explanation of why the objective is important for the project's success
   c. explanation of how the objective is assessed
   d. justified weighting factor for the objective

6. List three common quantitative objectives that should be used in each matrix.
   a. _____
   b. _____
   c. _____

7. Which of the following are common problems with decision matrix objectives?
   a. testing criteria or methods that do not correlate well with the objective being tested
   b. objectives that do not differentiate between individual designs in a meaningful way
   c. objectives that have little relevance to the actual performance of the subsystem
   d. objectives that are too similar to each other
   e. erroneous evaluation of an objective

8. If all concepts in a matrix perform similarly on an objective such as manufacturing time, the weighting factor assigned to this objective should be relatively high since the objective provides valuable information for the selection of the best design. T / F

9. Weighting factor justifications must include a clear explanation as to why each objective is more or less important than the other objectives. T / F

10. If a group uses weight as an objective to reduce the overall mass of the robot, this objective can only appear in one decision matrix. T / F

11. Adding a new concept to one matrix does not require the addition of a new concept to others. T / F

12. If a concept cannot be tested due to motor, wheel, or other mechanism limitation, how must the student/group proceed?
    a. modification(s) to the concept must be made so it can function and be compared to the others
    b. sketches and a written description that clearly illustrate and explain the modifications made to the original concept must be made
    c. the original concept in the decision matrix should be replaced with the modified one

13. If introducing a new concept or a modified version of an existing concept (such as combining designs, changing dimensions, adding/removing components), how must the student/group proceed?
    a. sketches and a written description that clearly illustrate and explain the new concept must be made
    b. the original concept(s) in the decision matrix should remain and the new one(s) added (e.g. Design 5, etcetera, for a group with four members)

14. Sketches for a new or revised concept do not require DR1-level detail, but they must be clear enough for any TA or teammate to understand. T / F

15. Quantitative objectives must be supported by clear calculations (including units) organized in tabular format in Appendix A with results summarized and discussed in the report body. T / F

16. If an objective can be quantified, students can evaluate it qualitatively to save time. T / F

17. Qualitative objectives must be supported with which of the following?
    a. written explanations justifying the score assignments
    b. logical comparisons of each concept
    c. reference to sketches illustrating the relevant features being tested
    d. evidence of testing

18. Groups must use the provided _____ _____ _____ and _____ _____ to create accurate cost summaries.

19. Groups must use the experience obtained in lab making parts and the _____ _____ _____ and _____ to create estimated manufacturing time summaries.

20. Analyses should include calculations of motor torques (amount required to drive the robot and operate each mechanism on the final design) & robot speed and estimated task completion times (object manipulation, sorting, release, etc.) for each concept under consideration. T / F

21. When estimating task completion times students are encouraged / required to include a top view of the arena showing the dimensioned path each conceptual design will follow when navigating the course.

22. Groups must use arrows and different line types to show the robot's planned path through the arena; each path segment's distance and estimated velocity should be labeled and explained based on example mobile platform testing; and a summary table showing the estimated total driving distance should be included as well. T / F

23. Groups must show a clear sample calculation with units for each computed value using the format shown in the provided calculations template, and present a summary table containing similar calculations for other concepts under comparison. T / F

24. When creating the summary calculation tables, groups must report a reasonable number of decimal places for each parameter based on the level of precision accompanying their computations or estimations. T / F

25. Groups may submit DR2 in a 2" binder with D-shaped rings, page protectors, and rainbows and unicorns on the cover. T / F

26. Groups will not lose points for submitting DR2 with report sections in the wrong sequence, or formatting and grammatical mistakes, because none of those affect our ability to easily grade their report submissions. T / F