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**SYSE 5110**

**HW3**

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2. Describe how specific resource requirements (i.e., hardware, software, people, facilities, data, and elements of support) are derived from the functional analysis.

The functional analysis allocates all functional requirements into functional packages that share closely related functions or that utilize a common resource. The process reduces the packages further into the lowest level of functional decomposition. The resources or mechanisms that are necessary to complete the functions of the system are identified in this process. Each function may be accomplished in several different approaches. Trade-off studies are analyzed to determine the best approach. The selected approach determines the resource requirements for the function. All of the functions included in the functional analysis are assigned resource requirements. The result is a collection of the total hardware, software, people, facilities, data, and support necessary to accomplish the each function.

6. Select a system of your choice and assign some top-level TPMs. Allocate these requirements as appropriate to the second and third levels.

System level TPMs for sports car

Weight (pounds): 3000 (maximum)

Velocity (mph): 100 (minimun)

Seating capacity (passengers): 4 (minimum)

Acceleration (0-60mph in seconds): 3.5 (minimum)

Production cost: $35,000 (maximum)

Power (horsepower): 400 (minimum)

Wheel diameter (inches): 18 (minimum)

Subsystem and component level TPMs

Engine/drivetrain subsystem power (horsepower): 400 (minimum)

Engine component power (horsepower): 400 (minimum)

Engine/drivetrain subsystem weight (pounds): 1000 (maximum)

Engine component weight (pounds): 600 (maximum)

Drivetrain component weight (pounds): 1000 (maximum)

Engine/drivetrain subsystem production cost: $10,000 (maximum)

Engine component production cost: $6,000 (maximum)

Drivetrain component production cost: $4,000 (maximum)

Chassis/suspension subsystem weight (pounds): 800 (maximum)

Chassis/suspension subsystem production cost: $3,000 (maximum)

Chassis component weight (pounds): 500 (maximum)

Chassis component production cost: $2,000 (maximum)

Suspension component weight (pounds): 300 (maximum)

Suspension component production cost: $1,000 (maximum)

Suspension component wheel diameter: (inches): 18 (minimum)

Body subsystem weight (pounds): 300 (maximum)

Body subsystem production cost: $4,000 (maximum)

Fender components wheel well diameter (inches): 25 (minimum)

Interior subsystem seating capacity (passengers): 4 (minimum)

Interior subsystem production cost: $5,000 (maximum)

Interior subsystem weight (pounds): 600 (maximum)

11. What is meant by design criteria? How are they developed? How are they applied in the design process?

The design criteria or design requirements are the characteristics or attributes that are necessary to achieve the design objectives. A non-exhasustive list of these criteria is as follows: functional capability, interoperability, sustainability, reliability, maintainability, usability, safety, security, supportability, serviceability, producibility, and disposability. Additionally, the design should consider human factors and all requirements for applicable specifications. Design criteria are primarily developed from the system operational requirements, the design-to criteria, the maintenance/support concept, and the prioritized TPMs. It is typically not possible to meet all of the design requirements; thus, a balance must be found that achieves the objectives for the system without implementing too many features that aren’t necessary or essential to meet requirements. Conducting a design requirements trade-off study assists in determining the features, characteristics, and attributes that should be incorporated into the design according to the need. These design requirements are the input for the detailed design phase that follows.