1. (16 points) Identify all of the following statements that are true about the basics of services.
   A. Services are best applied in building large-scale systems using the client-server model
      
      **Solution:** False:

   B. Screen-scraping from a web-page is convenient for system implementation because it protects us from the meaning of the information that is obtained
      
      **Solution:** False: the meaning of the information is essential; screen-scraping focuses on heuristic methods for extracting information that disregard meaning, so it proves difficult to use when we try to use that information such as to compose services

   C. Formulating goals for agents representing business partners or user is a high-level way of instructing such agents
      
      **Solution:** True:

   D. Distributed settings make it easier to ensure consistency than do centralized settings
      
      **Solution:** False:

   E. A major benefit of traditional Electronic Data Interchange (EDI) is that it placed one party in charge of maintaining the document schema and process specifications that all its partners complied with
      
      **Solution:** False: this is a shortcoming since it is logically centralized

   F. Distributed enactments are subject to the (potential) hazards of race conditions
      
      **Solution:** True:

   G. One of the biggest challenges in realizing the vision of service-oriented computing is ensuring that the parties involved interact in a trustworthy manner
      
      **Solution:** True:

   H. Autonomic computing deals with interactions among autonomous agents
      
      **Solution:** False:

2. (8 points) Identify all of the following statements that are true about conceptual modeling
   A. If a value map satisfies the properties of totality, monotonicity, and consistent inversion, then we know it is correct
      
      **Solution:** False: correctness depends on what values we associate with each other (monotonicity is a synonym for order preserving)

   B. A theoretical motivation for consistent inversion is to lose as little information as we can despite the fact that it may not be possible to perfectly align the value sets at hand
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Solution: True:

C. All else being equal, we prefer a knowledge representation that is easier to elaborate

D. All else being equal, we prefer a knowledge representation that supports expressing incomplete knowledge about an entity

Solution: True: we often need to acquire knowledge incrementally

3. (20 points) Identify all of the following statements that are true about OWL

A. It is inconsistent to declare a class that is disjoint with itself

Solution: False: can be empty

B. The intersection of an OWL class \( C \) with any of its superclasses equals \( C \) itself

Solution: True:

C. Only an OWL Object Property may be declared to be a Functional Property

Solution: False:

D. It is inconsistent to declare a Functional Property whose domain is an empty class

Solution: False: the property will have no instances then

E. It is inconsistent to declare a Functional Property whose range is an empty class

Solution: False: the property will have no instances then

F. Only an OWL Object Property may be declared to be a Transitive Property

Solution: True:

G. Assuming we can declare a property as being \textit{irreflexive}, we can model that a person is not his or her own sibling by asserting \textit{isSiblingOf} to be symmetric, transitive, and irreflexive

Solution: True: (as an aside, irreflexive is not a primitive in OWL 1 but was added in OWL 2)

H. A restriction is one of the more complicated kinds of an axiom in the OWL language

Solution: False: it is a constructor, i.e., yields a class

I. Given any property \( P \) and class \( C \), any restriction of \( P \) with respect to some values from \( C \) is a subclass of any restriction of \( P \) with respect to all values from \( C \)
Solution: False: consider an instance that relates through $P$ to one resource that is an instance of $C$ and to one resource that is not an instance of $C$; then, it shows up in some values from $C$ but not in all values from $C$.

J. Whereas RDF assertions can be spread over many input files, OWL assertions need to be placed in the same input file for the OWL semantics to apply.

Solution: False:

4. (26 points) Identify all of the following statements that are true about RDF

A. RDF supports assertions to capture a frame-like knowledge representation

Solution: True:

B. RDF relies upon literals being named via URIs

Solution: False: RDF relies upon resources being named via URIs

C. Each vertex in an RDF graph corresponds to exactly one statement

Solution: False: to a resource

D. A reasonable criterion for assessing RDF models is how easy it is to draw useful inferences from a particular representation

Solution: True:

E. In an RDF-based representation, an adverb such as quickly necessarily maps to a resource

Solution: False: RDF has no standard representation for adverbs; we can map them to literals or even properties if we like, though the resulting model may be more or less desirable for the reasoning we have in mind.

F. The typical event-based representation discussed in class (an event being modeled as a resource with properties asserted on it) can lead to spurious inferences because it is not context sensitive

Solution: True: recall the example of the slow crossing of the English Channel, which was also a fast swimming of the English Channel.

G. Using RDF, we cannot express self-referential statements

Solution: False:

H. In RDF reification applies to one statement at a time

Solution: True: reification maps a statement to a resource

I. Using RDF, we can reify any literal into a statement


J. RDF supports aggregating resources wherein if you delete a resource all its constituent resources are deleted as well

Solution: False: no such notion of aggregation

K. In RDF, a property is simply a kind of resource

Solution: True:

L. In RDF, a resource is simply a kind of property with only one argument

Solution: False:

M. The rdf:domain of rdf:domain is rdf:Property

Solution: True: