INT202 Server-side Web Programming – Topic: Servlet
(Pre-test) Quiz **Solution**

1. In Java EE technology, what are the components in an application server and what are their responsibilities?
   In Java EE technology, an application server has 2 components which are
   (1) a web container, and
   (2) an EJB container.
   The web container is responsible for presentation logic and client interaction of the application while the EJB container are responsible for business logic and data persistency of the application.
2. In Java EE technology, what are the web components in the web container? List them in the order that they are invented and explain how they are related.
   In Java EE technology, web components in the web container are, in the order that they are invented,
   (1) Java Servlet,
   (2) Java Server Pages (JSP),
   (3) JSP Standard Tag Library (JSTL),
   (4) Expression Language (EL), and
   (5) Java Server Faces (JSF).
   – Java Servlets are suitable for writing programming logic because they are normal java codes, like assignment statements, if statements, for/while loops, and others but they are not good for writing presentation which are written in HTML. It is difficult to web page structures written inside a servlet code.
   – Java Server Pages (JSP) are, on the other hand, suitable for writing web presentation because they look like normal html codes which have java codes inside. It is easy (i.e., easier than servlet) to see web page structures written in JSP pages but it is difficult to read/write programming logic inside JSP pages because it is inside html codes. JSPs help servlets by taking care of presentation logic and let servlets take care of programming logic.
   – JSTLs are tag libraries of JSPs which help transforming JSPs to look more like html because JSTL codes are written by using tags like html codes. Presentation logic that needs to use if statements and/or for/while loops can be written by using JSTL tags. So, JSTLs help making JSP easier to write presentation logic.
   – EL was initially a part of JSTL and written inside JSTL only but, later on, can be written inside JSP pages outside JSTL as well. Finally, EL can be used anywhere (inside JSTL, inside JSP, or inside JSF). EL codes even make JSP pages look simpler because they look like text contents inside html pages.
   – JSFs are an alternative to servlet/JSP/JSTL/EL altogether. JSF pages use EL in facelets, which is usually different from EL used in JSP. JSFs are suitable for writing UI components in web pages.
3. What are ${ } and #{ } and what is the difference between them?
   ${ } and #{ } are Expression Languages.
   ${ } expressions are used for immediate evaluation which is used in read-only value expression only while #{ } expressions are used for deferred evaluation which can be used for both getting and setting values to bean's properties.
   Both ${ } and #{ } can be used in both JSP pages and JSF pages but is uncommon to see #{ } in JSP pages because it can only be used in JSP custom tags if used in JSPs.
4. In multithreading environment of Java's object-oriented programming, what kinds of variables are shared between threads and what kinds of variables are not shared between threads?
   Class variables (i.e., static variables declared in the class definition outside the method definition) and instance variables (i.e., non-static variables declared in the class definition outside the method definition) are shared by threads.
   Local variables (i.e., non-static variables declared in the method definition) and parameters of methods (i.e., method's arguments) are not shared between threads.

หมายเหตุ: เฉพาะส่วนที่ขีดเส้นใต้ คือส่วนของเฉลย ส่วนรายละเอียดอื่น ๆ ที่ไม่ได้ขีดเส้นใต้ เป็นคำอธิบายเพิ่มเติมเพื่อให้ความรู้เท่านั้น