CS 262: Answers to Guide 1

1. Software Engineering
   1. Software Engineering: “the systematic application of scientific and technological knowledge, methods, and experience to the design, implementation, testing, and documentation of software”
   2. Software engineering is a sub-field of traditional engineering and overlaps with computer science in that engineers must have knowledge of computer programming.
   3. Software engineering as a professional discipline requiring licensing differs in criteria globally. In the USA, licensing is optional (NCEES Professional Engineer exam). The IEEE Computer Society and ACM, publish guides to software engineering.
2. Software Project Management
   1. Software developers are similar to modular components in that the management of a software development team is traditionally done via ignoring the characteristics of the individual, treating those details as a black box, and assuming everyone is designed to integrate via a standard interface.
   2. Software developers are dissimilar to modular components in that the characteristics of the individual heavily influences how they interface together as a group and thus there is no general standardized interface that can be used for the cohesive whole.
   3. Software projects are challenging in terms of sociological issues in that it is far more difficult to manage human inter-personal relationships among a software development team then to manage and resolve technical issues that arise from the work of individual team members.
   4. Brook’s Law: Observation about software project management that states “adding human resources to a late software project makes it later” – translation: adding another software developer increase the project completion time.
      1. Reason 1: takes time for additional team members to become productive as they must be taught about the project by other team members, which takes time away from the project.
      2. Reason 2: increased communication overhead due to increased difficulty of synchronizing tasks among the entire team.
      3. Reason 3: there is limited divisibility of the tasks in a project; ie. One woman 9 months to make a baby but nine woman can’t make a baby in one month.
      4. General issue of diminishing returns.
   5. The Big Five Personality Test
      1. Refer to website and account results.
3. Android
   1. Introduction to Android
      1. Android is based on the Linux Kernel.
      2. Android uses the Java programming language for app development and Extensible markup language (XML) files for data resources.
      3. Google controls and develops the Android project and tools.
   2. Create Your First Android App
      1. Android Studio is the primary IDE used to develop apps.
      2. AndroidManifest.xml file: Specifies info about the app for the Android runtime environment. Read by the Android system to determine all existing components of the app.
      3. Android Application Package (APK): the package file format for distributing and installing Android mobile apps.
      4. Gradle: the foundation of the build system with Android-specific features provided by the Android plugin for Gradle.
         1. Build.gradle files uses Gradle (Doman Specific Language) for describing and manipulating the build logic using Groovy (dynamic language for JVM)
      5. Android Virtual Device (AVD): creates a virtual device/emulator simulating the configuration of a particular type of Android device.
   3. The Android Studio Debugger
      1. LogCat (Android Monitor): display log messages as the app runs. Will display logging statements if added to app code. (ie. Log.d(LOG\_TAG, “message”);
      2. Profiler (Dalvik Debug Monitor Server): provides port-forwarding services, screen capture, thread/heap info, logcat/process,/radio state info, incoming call/SMS/location spoofing, etc.
      3. Running an application in debug mode differs from normal mode in that no optimization is performed on the code thereby allowing sequential execution of each line of code in order to stop at each breakpoint and see where exactly execution fails in the code. Different libraries may be used and there could be additional log output specifically for debugging purposes.