L0.1 Why Learn Assembly, L0.2 Computer and Assembly Language Quiz ANS

1. Which statement best captures why assembly isn’t “just another language”?  
   A. It is easier to read than C  
   B. It is an interface between hardware and software and underlies HLL implementations  
   C. It is fully portable across architectures  
   D. It eliminates bugs due to its low-level nature  
   ANS: B
2. Which of the following is a common disadvantage of writing large applications entirely in assembly?  
   A. Excessive compiler optimization  
   B. Difficult to develop, read, and maintain; not portable  
   C. Inability to access special instructions  
   D. Incompatibility with embedded systems  
   ANS: B
3. Which scenario typically requires assembly on ARM Cortex‑M?  
   A. Generic arithmetic in a desktop application  
   B. Device driver sections requiring precise register/I/O access  
   C. High‑level GUI layout code  
   D. Standard library string functions  
   ANS: B
4. What is the primary reason startup code for microcontrollers is often in assembly?  
   A. HLLs cannot declare global variables  
   B. It must set stack/heap, define the vector table, and default ISRs at reset  
   C. C compilers cannot initialize constants  
   D. Assembly is required for loops  
   ANS: B
5. Which example shows how understanding data representation avoids logic errors when comparing signed and unsigned values?  
   A. Using volatile on all variables  
   B. Casting unsigned uint32\_t x to signed int32\_t before comparing with a signed int32\_t y  
   C. Always using uint32\_t for all variables  
   D. Turning on compiler optimizations  
   ANS: B
6. Which registers are general‑purpose on ARM Cortex‑M?  
   A. R0–R12  
   B. R13–R15  
   C. CONTROL, BASEPRI, PRIMASK  
   D. xPSR only  
   ANS: A
7. What are the roles of R13, R14, and R15 on ARM Cortex‑M?  
   A. General purpose  
   B. Program counter, stack pointer, and link register in that order  
   C. Stack pointer (R13), link register (R14), program counter (R15)  
   D. Interrupt mask registers  
   ANS: C
8. What does the instruction BX lr do in a typical function epilogue on Cortex‑M?  
   A. Saves lr to the stack  
   B. Branches to the address in lr and sets execution state  
   C. Loads the next instruction into lr  
   D. Disables interrupts  
   ANS: B
9. Which statement about instruction fetch is accurate for Cortex‑M?  
   A. The PC increments by 2 for every 16‑bit instruction fetch  
   B. The PC always increments by 4 because instruction fetches bring 4 bytes (either two 16‑bit or one 32‑bit instruction)  
   C. The PC increments by 8 on 32‑bit instructions  
   D. The PC increments by 1 byte on unaligned code  
   ANS: B
10. In a Harvard architecture microcontroller like Cortex‑M, which is a main advantage compared to pure von Neumann for DSP‑like workloads?  
    A. Single shared memory reduces complexity  
    B. Simultaneous instruction and data fetch increase bandwidth and predictability  
    C. Unified address space aids code density  
    D. Automatic cache coherence  
    ANS: B
11. What is the size of each memory location in a byte‑addressable memory system as described?  
    A. 1 bit  
    B. 8 bits  
    C. 16 bits  
    D. 32 bits  
    ANS: B