Competency Proficiency Self Rating

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| S.No. | **C Programming:** | 1 | 2 | 3 | 4 | 5 |
| 1 | Keywords, Data-Types, Variables, Constants, Operators, Identifiers, Storage Class Specifiers, Control Flow Statements, Strings |  |  |  |  |  |
| 2 | Loops - for, while etc. |  |  |  |  |  |
| 3 | Functions and Recursion |  |  |  |  |  |
| 4 | Arrays, Multidimensional arrays |  |  |  |  |  |
| 5 | Pointers - Pointer Arithmetic, Pointers and Arrays, Pointers and Functions, Pointers and Strings. |  |  |  |  |  |
| 6 | User defined types - Structures, Unions, Enum, Typedef, complex structures using Structure and union, pointers to use user-defined types. |  |  |  |  |  |
| 7 | Bit wise operators and their use, Bit operations. |  |  |  |  |  |
| 8 | Preprocessors - Preprocessor using in C program. |  |  |  |  |  |
| 9 | Basics of different I/O including File operations. |  |  |  |  |  |
| 10 | Variable No. of arguments, Command Line arguments. |  |  |  |  |  |
| 11 | Basics of Program Writing & Coding Practices. |  |  |  |  |  |
| 12 | Compilation - Compilation & cross compilation and makefile concept, Debugging and Optimization of C programs. |  |  |  |  |  |
| 13 | Hands on experience on writing C programs. |  |  |  |  |  |

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| 1: No Experience | 2: Basic Knowledge | 3: Working Knowledge | 4: Proficient knowledge | 5: Subject Matter Expert |

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| S.No. | **C++:** | 1 | 2 | 3 | 4 | 5 |
| 1 | Basic C++ concept - Class, Constructor and destructor concept, operators, |  |  |  |  |  |
| 2 | Operator overloading, Uses of Friend, static, extern and their use, use of volatile, |  |  |  |  |  |
| 3 | C++ Standard version 14,17,20 |  |  |  |  |  |
| 4 | Polymorphism - Concept of polymorphism, different uses of virtual keyword |  |  |  |  |  |
| 5 | STL - Common STL concepts like List, vector, iterator, string etc. |  |  |  |  |  |
| 6 | Templates: Class and Function Templates Hands on. |  |  |  |  |  |
| 7 | Design Pattern - Hands on design pattern like Factory, Singleton, MVVP, MVC, Observer etc. |  |  |  |  |  |

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| S.No. | **Data Structures & Algorithms:** | 1 | 2 | 3 | 4 | 5 |
| 1 | Abstract Data Types |  |  |  |  |  |
| 2 | Hashing, Maps, Hash Maps. |  |  |  |  |  |
| 3 | Dictionaries |  |  |  |  |  |
| 4 | Linked Lists, Stacks, Queues, |  |  |  |  |  |
| 5 | Trees |  |  |  |  |  |
| 6 | [Stacks & Queues](https://techdevguide.withgoogle.com/paths/data-structures-and-algorithms/#sequence-4) |  |  |  |  |  |
| 7 | Heaps |  |  |  |  |  |
| 8 | [Graphs](https://techdevguide.withgoogle.com/paths/data-structures-and-algorithms/#sequence-6) |  |  |  |  |  |
| 9 | Runtime Analysis |  |  |  |  |  |
| 10 | Searching and sorting |  |  |  |  |  |

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| S.No. | **Communication Protocols:** | 1 | 2 | 3 | 4 | 5 |
| 1 | SOME/IP, MQTT, DBUS, Message queues, Shared Memory, DDS,  ROS nodes (Robotic) TCP, UDP. |  |  |  |  |  |

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| S.No. | **Board Bring up & Device Drivers Concept:** | 1 | 2 | 3 | 4 | 5 |
| 1 | Hands on experience on Board Bring up activity |  |  |  |  |  |
| 2 | Hands on Knowledge on configuration and debugging of device drivers for different embedded peripheral. |  |  |  |  |  |
| 3 | Familiarization of UART, SPI, I2C, CAN, HW Timer, RTC, WDG, DMA, ADC, DAC etc. |  |  |  |  |  |

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| S.No. | **Android:** | 1 | 2 | 3 | 4 | 5 |
| 1 | Development knowledge about AIDL, HIDL, HAL, VHAL (Should have experience adding new services to VHAL or extending VHAL and use it in app.), Services. |  |  |  |  |  |
| 2 | Inter Process communication between hardware binders using Fast Message Queue, binder, shared memory (IAllocator, IMemory) and communication between HAL and application using Interface |  |  |  |  |  |
| 3 | Knowledge in SEpolicy and implementation of SEpolicy. |  |  |  |  |  |
| 4 | Porting and Integration of Android framework to new hardware platforms |  |  |  |  |  |
| 5 | Working experience in Core / Android Java programming, Android SDK, Android NDK. |  |  |  |  |  |
| 6 | Knowledge on Android AOSP, Init, System Services, Build system etc |  |  |  |  |  |
| 7 | Through knowledge on Android Architecture, Android Subsystems like Display, Sound, Camera |  |  |  |  |  |
| 8 | Should have good knowledge and understanding of Android development, debugging tools |  |  |  |  |  |
| 9 | Experience in modification of Android framework code for customization |  |  |  |  |  |

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| S.No. | **Qnx :** | 1 | 2 | 3 | 4 | 5 |
| 1 | Knowledge in real-time operating systems especially on QNX |  |  |  |  |  |
| 2 | Experience working with QNX Momentics IDE, QNX system profiler. QNX Resource manager |  |  |  |  |  |
| 3 | Should have deeper understanding of middleware components in QNX |  |  |  |  |  |
| 4 | Experience in QNX Hypervisor, Virtio (with QNX + Android / Qnx + Linux) |  |  |  |  |  |

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| S.No. | **Operating system concept:** | 1 | 2 | 3 | 4 | 5 |
| 1 | Process Management, Interposes Communication & Synchronization, |  |  |  |  |  |
| 2 | Memory Management, Different I/O, |  |  |  |  |  |
| 3 | POSIX Thread Programming, POSIX Semaphores, Murexes, Conditional Variables, Message Queues, Shared Memory, |  |  |  |  |  |
| 4 | Writing, Debugging and Testing of Multiprocessor and Multithreaded Applications, |  |  |  |  |  |
| 5 | Socket Programming |  |  |  |  |  |
| 6 | Performance optimizations in the areas: CPUs, GPU, DDR, Sensors, System Performance Benchmarks |  |  |  |  |  |
| 7 | Perform trouble shooting in drivers, BSP, OS, middle ware software. |  |  |  |  |  |
| 8 | Usage of tools like serial debuggers, GDB, trace analyzer, Logic analyzer for debugging. |  |  |  |  |  |

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