



The Code Review Checklist provides a company guideline for checking code including pass/fail parameters and recording any comments when the test fails.

During a project, this document is used by team members as follows:

- 1 During project planning, it is utilized as a reminder for how much review time should be allocated during the project for the software being developed
- 2 During design and development (coding) portion of the project, the checklists are used to conduct code reviews.

*The list of test items is representative and should be modified prior to use to reflect your development environment and standards.*

### Generic Checklist for Code Reviews

#### Structure

	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Does the code completely and correctly implement the design?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Does the code conform to any pertinent coding standards?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is the code well-structured, consistent in style, and consistently formatted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are there any uncalled or unneeded procedures or any unreachable code?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are there any leftover stubs or test routines in the code?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Can any code be replaced by calls to external reusable components or library functions?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are there any blocks of repeated code that could be condensed into a single procedure?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is storage use efficient?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are symbolics used rather than "magic number" constants or string constants?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Hard coded background URL.
<input type="checkbox"/>	Are any modules excessively complex and should be restructured or split into multiple routines?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

#### Documentation

	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Is the code clearly and adequately documented	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Minimal comments.



<input type="checkbox"/>	with an easy-to-maintain commenting style?			
<input type="checkbox"/>	Are all comments consistent with the code?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

### Variables

	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Are all variables properly defined with meaningful, consistent, and clear names?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Do all assigned variables have proper type consistency or casting?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are there any redundant or unused variables?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

### Style

	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Does the code follow the style guide for this project?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is the header information for each file and each function descriptive enough?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is there an appropriate amount of comments? (frequency, location, and level of detail)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Insufficient comments.
<input type="checkbox"/>	Is the code well structured? (typographically and functionally)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are the variable and function names descriptive and consistent in style?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are "magic numbers" avoided? (use named constants rather than numbers)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Potential hard coded values.
<input type="checkbox"/>	Is there any "dead code" (commented out code or unreachable code) that should be removed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is it possible to remove any of the assembly language code, if present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is the code too tricky? (Did you have to think hard to understand what it does?)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Did you have to ask the author what the code does? (code should be self-explanatory)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

### Architecture

	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Is the function too long? (e.g., longer than fits on one printed page)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Can this code be reused? Should it be reusing something else?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	



<input type="checkbox"/>	Is there minimal use of global variables? Do all variables have minimum scope?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are classes and functions that are doing related things grouped appropriately? (cohesion)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is the code portable? (especially variable sizes, e.g., "int32" instead of "long")	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Specific to web environment.
<input type="checkbox"/>	Are specific types used when possible? (e.g., "unsigned" and typedef, not just "int")	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are there any if/else structures nested more than two deep? (consecutive "else if" is OK)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are there nested switch or case statements? (they should never be nested)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

### Arithmetic Operations

	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Does the code avoid comparing floating-point numbers for equality?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Does the code systematically prevent rounding errors?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Does the code avoid additions and subtractions on numbers with greatly different magnitudes?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are divisors tested for zero or noise?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

### Loops and Branches

	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Are all loops, branches, and logic constructs complete, correct, and properly nested?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are the most common cases tested first in IF- -ELSEIF chains?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are all cases covered in an IF- -ELSEIF or CASE block, including ELSE or DEFAULT clauses?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Does every case statement have a default?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are loop termination conditions obvious and invariably achievable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are indexes or subscripts properly initialized, just prior to the loop?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Can any statements that are enclosed within loops be placed outside the loops?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Does the code in the loop avoid manipulating the index variable or using it upon exit from the loop?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	



### Defensive Programming

	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Are indexes, pointers, and subscripts tested against array, record, or file bounds?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No explicit checks seen.
<input type="checkbox"/>	Are imported data and input arguments tested for validity and completeness?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No validation visible.
<input type="checkbox"/>	Are all output variables assigned?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are the correct data operated on in each statement?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is every memory allocation deallocated?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable or visible.
<input type="checkbox"/>	Are timeouts or error traps used for external device accesses?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable or visible.
<input type="checkbox"/>	Are files checked for existence before attempting to access them?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable or visible.
<input type="checkbox"/>	Are all files and devices left in the correct state upon program termination?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable or visible.

### Maintainability

	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Does the code make sense?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Does the code comply with the accepted Coding Conventions?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Does the code comply with the accepted Best Practices?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Does the code comply with the accepted Comment Conventions?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Comments insufficient.
<input type="checkbox"/>	Is the commenting clear and adequate? (As a guide, each file will have a comment at the start, explaining what the code does, possibly a comment at the start of each function, and comments as needed to explain complex or obfuscated code.)		<input checked="" type="checkbox"/>	Insufficient commenting.
<input type="checkbox"/>	Are ideas presented clearly in the code?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is encapsulation done properly?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is the code not too complex?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are there no unnecessary global variables?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is the reading order in source code from top to bottom?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are there unused variables or functions?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	



### Requirements and Functionality

	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Does the code match the requirements, specifications and standards?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is the logic proper? Does the code function as needed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

### System and Library Calls

	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Do all system calls have their return status checked?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are all possible errors from system or library calls handled?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable or visible.
<input type="checkbox"/>	Are signals caught and handled?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable or visible.
<input type="checkbox"/>	Is mutex() used on multithreaded code on global variables?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable or visible.

### Reusability

	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Are all available libraries being used effectively?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are available openmrs util methods known and used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is the code as generalized/abstracted as it could be?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is the code a candidate for reusability?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

### Robustness

	Description of Item	Pass	Fail	Comments
	Are all parameters checked?	✓		
	Are error conditions caught?	✓		
	Is there a default case in all switch statements?		✓	Not applicable.
	Is there non-reentrant code in dangerous places?	✓		
	Is the usage of macros proper? (Readability, complexity, portability...)	✓		
	Is there unnecessary optimization that may hinder maintainability?	✓		



Security				
	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Does the code appear to pose a security concern?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No explicit security measures seen.
<input type="checkbox"/>	Do Service methods have an @Authorize annotation on them	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<input type="checkbox"/>	Does the application use an inclusion list (known, valid, and safe input) rather than an inclusion list (rejecting known malicious or dangerous input)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<input type="checkbox"/>	Is all user input encoding set by the server?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<input type="checkbox"/>	Is all character encoding set by the server?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<input type="checkbox"/>	If cookies contain sensitive data, are they marked secure?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<input type="checkbox"/>	Do input surfaces in Web parts and other customizations include boundary checks, input data integrity checks, and appropriate exception handling to protect from cross-site scripting and SQL injection.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<input type="checkbox"/>	Does the design address potential canonicalization issues?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable

Control Structures				
	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Does the application log sensitive data in clear text.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<input type="checkbox"/>	Sensitive data is not stored in cookies.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<input type="checkbox"/>	Sensitive data is not stored in unencrypted, hidden form fields or query strings. It is maintained by using server-side state management.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	SSL, IPSEC with encryption, or application layer encryption prior to transmittal is used to protect sensitive data during transmission.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	Sensitive data is not cached. Output caching is off by default.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	Sensitive data that is transferred via email uses S/MIME encryption or Information Rights Management (IRM), depending upon the intended recipient.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	Does the code make use of infinite loops?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Does the loop iterate the correct number of times?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	



### Resource Leaks

	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Does the code release resources?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<input type="checkbox"/>	Does the code release resources more than once?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<input type="checkbox"/>	Does the code use the most efficient class when dealing with certain resources?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable

### Error Handling

	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Does the code comply with the accepted Exception Handling Conventions?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Does the code make use of exception handling?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Does the code simply catch exceptions and log them?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Does the code catch general exception (java.lang.Exception)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<input type="checkbox"/>	Does the code correctly impose conditions for "expected" values?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are input parameters checked for proper values (sanity checking)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	Are error return codes/exception generated and passed back to the calling function?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are error return codes/exceptions handled by the calling function?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are null pointers and negative numbers handled properly?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Do switch statements have a default clause used for error detection?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are arrays checked for out of range indexing? Are pointers similarly checked?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is garbage collection being done properly, especially for errors/exceptions?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is there a chance of mathematical overflow/underflow?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are error conditions checked and logged? Are the error messages/codes meaningful?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Would an error handling structure such as try/catch be useful? (depends upon language)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	



### Timing

	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Is the worst case timing bounded? (no unbounded loops, no recursion)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are there any race conditions? (especially multi-byte variables modified by an interrupt)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is appropriate code thread safe and reentrant?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are there any long-running ISRs? Are interrupts masked for more than a few clocks?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is priority inversion avoided or handled by the RTOS?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	Is the watchdog timer turned on? Is the watchdog kicked only if every task is executing?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	Has code readability been sacrificed for unnecessary optimization?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

### Validation & Test

	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Is the code easy to test? (How many paths are there through the code?)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Do unit tests have 100% branch coverage? (code should be written to make this easy)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are the compilation and/or lint checks 100% warning-free? (Are warnings enabled?)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is special attention given to corner cases, boundaries, and negative test cases?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	Does the code provide convenient ways to inject faulty conditions for testing?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Are all interfaces tested, including all exceptions?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Has the worst case resource use been validated? (stack space, memory allocation)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	Are run-time assertions being used? Are assertion violations logged?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is there commented out code (for testing) that should be removed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	





Hardware				
	Description of Item	Pass	Fail	Comments
<input type="checkbox"/>	Do I/O operations put the hardware in a correct state?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<input type="checkbox"/>	Are min/max timing requirements met for the hardware interface?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<input type="checkbox"/>	Is it ensured that multi-byte hardware registers can't change during read/write?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<input type="checkbox"/>	Does the software ensure that the system resets to a well defined hardware system state?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<input type="checkbox"/>	Have brownout and power loss been handled?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Is the system correctly configured for entering/leaving sleep mode (e.g. timers)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Have unused interrupt vectors been directed to an error handler?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<input type="checkbox"/>	Has care been taken to avoid EEPROM corruption? (e.g., power loss during write)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable