Custom Which Script (custom_which.sh) – Test and Verification Guide

Field	Value
Project	Custom Executable Locator (custom_which.sh)
Author	Sanjeet Prasad
Email	sanjeet8.23@gmail.com
Environment	Ubuntu 22.04 (VirtualBox)
Date	October 19, 2025

1. Script Functionality Specification

The custom_which.sh script emulates the Unix which command by locating executable files based on command names. It supports both absolute and relative paths, and searches through the PATH environment variable. It also supports the -a flag to list all matching executables.

Core Features

- **Deduplication and Resolution**: Resolves each command to its first valid executable path.
- **Pathname Detection**: Treats inputs with / as direct pathnames.
- **Permission Checks**: Validates that files are both readable and executable.
- **Directory Exclusion**: Directories are not considered valid commands.
- **Special PATH Handling**:
    - Leading: → current directory
    - Trailing: → current directory
    - Double:: → inserts current directory
    - Explicit. in PATH → current directory
- **Flag Support**:
    - -a: Lists **all** matching executables in PATH
- **Constraint**: Does **not** use temporary files or restricted commands (which, type, locate, ls)

2. Verification Steps

Step 1: Preparation

Place both the main script (custom_which.sh) and the automated validation script (test_suite_custom_which.sh) in the same directory.

$ chmod +x custom_which.sh

$ chmod +x test_suite_custom_which.sh

Step 2: Automated Validation

Run the full test suite:

$ ./test_suite_custom_which.sh ./custom_which.sh

$ ./test_suite_custom_which.sh ./custom_which.sh -v

✅ **Test Suite Results (23 Tests)**

Test ID	Test Focus	Status
T1	Basic Command Resolution	Passed
T2–T6	PATH Variations (Standard, Leading, Double, Trailing, Dot)	Passed
T7	-a Flag – Multiple Matches	Passed
T8	Absolute Path Handling	Passed
T9	Relative Path Handling	Passed
T10	Multiple Command Arguments	Passed
T11	Directory vs Executable File Distinction	Passed
T12	Directory with Absolute Path	Passed
T13	Directory with Relative Path	Passed
T14–T23	Edge Cases (Nonexistent, Permission, Self-reference)	Passed

Manual Sanity Check

Command	Expected Output	Status
./custom_which.sh bash	/usr/bin/bash	Verified
./custom_which.sh -a tar	/bin/tar\n/usr/bin/tar	Verified
./custom_which.sh ./myscript.sh	./myscript.sh	Verified
./custom_which.sh ./mydir	NOT FOUND	Verified
./custom_which.sh unknowncmd	NOT FOUND	Verified

Final Test Result Summary (Ubuntu Linux)

- **Total Tests**: 23
- **Passed**: 23
-