**A Montana Tech Method Software Development Standard**

**MTM Software Development Standards Overview**

Version 5.0
August 13, 2014

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Montana Tech of the University of Montana*

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| *Version* | *Date* | *Author*  | *Comment* |
| 1.0 | 09/21/07 | Frank Ackerman | First version |
| 1.1 | 11/07/07 | Frank Ackerman | Minor corrections/additions |
| 2.0 | 07/02/09 | Frank Ackerman | Added new section 3 |
| 2.1 | 10/25/09 | Frank Ackerman | Minor corrections |
| 3.0 | 01/17/10 | Frank Ackerman | Define simple and complex |
| 3.1 | 05/18/10 | Frank Ackerman | Documents for program products |
| 3.2 | 07/16/10 | Frank Ackerman | Common reference to simple and product |
| 3.3 | 04/16/11 | Frank Ackerman | Minor wording changes |
| 3.4 | 06/21/11 | Frank Ackerman | Explanation for two classes of development standards |
| 4.0 | 05/25/13 | Frank Ackerman | Remove the longer standard, *MTM Simple Program Development Document*. |
| 4.1 | 08/13/14 | Frank Ackerman | Change nominclature |

**Montana Tech Software Engineering Students:**

These Montana Tech Method software engineering standards encapsulate Dr. Ackerman’s decades of development experience in the software industry at best-practice organizations; writing, reviewing, and teaching the IEEE software engineering standards world-wide, and many suggestions from various texts and Montana Tech students. These standards have gone through many revisions and additions over several years. They are part of your software engineering studies so that (1) you may have the experience of developing software to a standard (which you may find you need to do if you take a job that requires that you develop high quality software), and so that (2) you will actually have the experience of developing high quality software. You are also invited to participate in the continuing evolution of these standards by studying them critically and making suggestions for their improvement.

Purpose

The purpose of this document is to provide an introduction to the techniques, processes, and applicable standards for engineering software products according to the Montana Tech Method (MTM).

Introduction

Many software development professionals think that the discipline of software engineering applies only to relatively large programs constructed by teams of programmers. At Montana Tech we have found that students who have mastered the computer science principles involved in constructing single person programs can profitably initially apply the discipline of software engineering to these programs. Our software engineering standards therefore address two classes of software programs/applications/systems:

1. Small Modules
2. Program Products

## Simple Programs

Some of the defining characteristics of Montana Tech Small Modules are:

* Constructed by 1 or 2 people
* Constructed in 1 to 6 weeks
* Typically, all programs are written in a single language and the MTM source file standard for that language is used
	+ Typically, development results in a single load module or at most a few load modules
	+ Normally development does not involve any formal V&V although developer test design and execution, correctness arguments, module testing, and inspections may be involved

The development of a small module is further described in *MTM For Small Module Development (SMDS) Overview*

## Program Products

Some of the defining characteristics of Montana Tech Program Products are:

* Constructed by 3 to 8 people
* Constructed in 7 to 52 weeks
* Modules may be written in different languages, and the MTM source files specification for those language is used.
	+ Development may result in several load modules
	+ In the usual case several inspections are required, as are unit tests and system test. Usability analysis and testing should also be performed for products that interface with users.

The development of a program product is formally documented in a series of documents. These are described in the *MTM For A Program Product Development Overview.*

Software Development Processes

At Montana Tech software development projects typically use a variation of the Montana Tech agile development process.

The Montana Tech agile development process is similar to the agile process commonly described in the Software Engineering literature in that:

* the development team meets at least once a week and often twice a week,
* development task are documented in project assignment sheets and delivery dates are established and tracked for each task, and
* software inspections play a key role in ensuring quality

The Montana Tech agile development process is different from the agile process commonly described in the literature in that:

* requirements, design, testing, user documentation, and product administration practices are formally documented as the project proceeds, although on-going development is usually not delayed while these documents are being written, and reviewed or inspected,
* a full set of Montana Tech Methods standards is being developed that provides explicit guidance to students in all aspects the software engineering projects they undertake.

Relationship to Software Development Products

Although the MTM Standards apply to any of the kinds of software development products that may be developed in CS Department software engineering projects, many of the standards apply just to single modules, and are thus independent of the product type. Such is the case for the following standards:

* *MTM Standard for C++ Source Files*
* *MTM Standard for Java Source Files*
* *MTM Standard for C# Source Files*
* *MTM Standard for Python Source Files*
* *MTM Design Language for Functions/Methods*