# Logic Modules

This document captures the various logic modules that have evolved over time, what they do, and where they are used. The goal is to condense these into single modules in a central location, and to optimize their function, but the first step is understanding.

## dev.mathops.db.old.logic.\*

ChallengeExamLogic

Does:

* Constructed per student ID
* Retrieves challenge status for that student in a specified course (available exam ID, reason unavail.)

Used in:

* dev.mathops.app.adm.testing.StartExamDialog
* dev.mathops.app.adm.testing.TestingIssueCard
* dev.mathops.app.checkin.CenterPanel
* dev.mathops.app.checkin.CourseNumbers
* dev.mathops.db.old.rawlogic.RawStchallengeLogic
* dev.mathops.session.txn.handers.GetExamHandler
* dev.mathops.session.txn.handers.UpdateExamHandler
* dev.mathops.web.site.admin.office.PageTestingIssueExam
* dev.mathops.web.site.html.challengeexam.ChallengeExamSession
* dev.mathops.web.site.lti.PageOnlineProctoredChallenge

CourseLogic [deprecate]

Does:

* Utility class, not instantiated
* Given RawStcourse record, checks whether course is complete (old course rules hard-coded)

Used in:

* dev.mathops.app.adm.student.ExamDetailsCard
* dev.mathops.web.site.html.UnitExamSession

ELMTutorialStatus [a reasonable model for status data classes]

Does:

* Data class with factory method taking student ID or record, current date/time, HoldsStatus object)
* Gathers ELM Tutorial status on construction:
  + Flag: is eligible for ELM tutorial
  + Flag: is eligible for ELM exam
  + Flag: ELM exam has been passed
  + Number of failed tries on ELM exam since last passing Unit 4 review
  + Date ranges when web site is available
  + Date ranges when online proctored ELM exam is available
  + Flag: Unit 3 review exam has been passed

Used in:

* dev.mathops.session.sitelogic.mathplan.data.StudentData
* dev.mathops.web.site.course.PageOutline
* dev.mathops.web.site.tutorial.elm.ElmTutorialSite
* dev.mathops.web.site.tutorial.elm.PageHome
* dev.mathops.web.site.tutorial.elm.PageHtmlPastExam
* dev.mathops.web.site.tutorial.elm.PageHtmlPractice
* dev.mathops.web.site.tutorial.elm.PageHtmlReviewExam
* dev.mathops.web.site.tutorial.elm.PageInstructionsElmPU
* dev.mathops.web.site.tutorial.elm.PageInstructionsElmTC
* dev.mathops.web.site.tutorial.elm.PageLesson
* dev.mathops.web.site.tutorial.elm.PageOnlineHelp
* dev.mathops.web.site.tutorial.elm.PageOutline
* dev.mathops.web.site.tutorial.elm.PagePlacementReport
* dev.mathops.web.site.tutorial.elm.PageScheduleElmPU
* dev.mathops.web.site.tutorial.elm.PageStartElmPU
* dev.mathops.web.site.tutorial.elm.PageStatus
* dev.mathops.web.site.tutorial.elm.PageVideo
* dev.mathops.web.site.tutorial.elm.TutorialMenu
* dev.mathops.web.sebsocket.proctor.MPSEndpoint

HoldsStatus [same model as ELMTutorialStatus]

Does:

* Data class with factory method taking student ID
* Gathers list of holds on student account

Used in:

* dev.mathops.session.sitelogic.mathplan.data.StudentData
* dev.mathops.web.site.course.PageOutline
* dev.mathops.web.site.tutorial.elm.ElmTutorialSite
* dev.mathops.web.sebsocket.proctor.MPSEndpoint

PageTrackLogic

Does:

* Utility class, not instantiated
* Given list of RawStcourse records, determines pace
* Tests whether single RawStcourse record is counted toward pace
* Given list of RawStcourse records (and optional pace), determines pace track
* Given list of RawStcourse records, determines the "first" course
* Given list of RawStcourse records and the student ID, makes the STTERM table record correct

Used in:

* dev.mathops.app.checkin.LogicCheckin
* dev.mathops.app.eos.PreFinalGradingSanityCheck
* dev.mathops.app.ops.snapin.messaging.EmailsNeeded
* dev.mathops.app.ops.snapin.messaging.EPF
* dev.mathops.app.ops.snapin.messaging.epf.EPFStudents
* dev.mathops.app.ops.snapin.messaging.tosend.MessagePopulationBuilder
* dev.mathops.dbobjs.batch.InitialCohortAssignment
* dev.mathops.dbobjs.batch.daily.CheckStudentTerm
* dev.mathops.dbobjs.batch.daily.ImportBannerStudentRegistrations
* dev.mathops.dbobjs.report.HtmlCsvCourseProgressReport
* dev.mathops.dbobjs.report.StudentsByPaceAndCourse
* dev.mathops.dbobjs.report.WeeklyStudentCount
* dev.mathops.dbobjs.report.analytics.UrgencyHistoryAnalysis
* dev.mathops.dbobjs.report.cron.PrecalcProgressReport
* dev.mathops.session.CsuLiveRegChecker
* dev.mathops.session.sitelogic.CourseSiteLogicCourse
* dev.mathops.session.sitelogic.data.SiteDataRegistration
* dev.mathops.web.site.course.PageCalendar
* dev.mathops.web.site.course.PageStdsCourse
* dev.mathops.web.site.course.PageStdsText
* dev.mathops.web.site.course.PateStdsTextModule

PlacementLogic

Does:

* Constructed per student, application term, date/time
* Gathers placement status on construction:
  + Available unproctored and local or online proctored exam IDs
  + Flag: allowed to take unproctored
  + Why unproctored is allowed and why it is unavailable
  + Flag: Placement has been attempted
  + Numbers of attempts used and remaining
  + Flag: unproctored attempt has been used
  + Why proctored is unavailable (long and short version)
  + Date ranges when unproctored can be taken
  + List of courses student has placed out of
  + List of courses student is cleared for
  + List of courses student has earned challenge credit for

Used in:

* dev.mathops.app.adm.student.StudentSummaryPanel
* dev.mathops.app.checkin.LogicCheckIn
* dev.mathops.session.sitelogic.mathplan.data.StudentData
* dev.mathops.session.txn.handlers.GetExamHandler
* dev.mathops.session.txn.handlers.GetReviewExamHandler
* dev.mathops.web.site.course.PagePlacementReport
* dev.mathops.web.site.html.placementexam.PlacementExamSession
* dev.mathops.web.site.html.reviewexam.ReviewExamSession
* dev.mathops.web.site.placement.main.PageToolHome
* dev.mathops.web.site.placement.main.PageToolInstructionsPu
* dev.mathops.web.site.placement.main.PageToolInstructionsRe
* dev.mathops.web.site.tutorial.elm.PagePlacementReport
* dev.mathops.web.site.tutorial.precalc.PagePlacementReport
* dev.mathops.web.websocket.proctor.MPSEndpoint

PrecalcTutorialLogic

Does:

* Constructed per student, current date [requires PrerequisiteLogic instance]
* Gathers precalculus tutorial status on construction:
  + List of holds on user's account
  + Flag: eligible for Precalculus tutorial
  + Course ID of the available Precalculus Tutorial (like "M 1170")
  + List of course IDs for which student is eligible to take Preacalc Tutorial Exam
  + Date ranges when the web site is available

Used in:

* dev.mathops.session.sitelogic.mathplan.data.StudentData
* dev.mathops.web.site.course.CourseMenu
* dev.mathops.web.site.placement.main.PageToolHome
* dev.mathops.web.site.tutorial.precalc.PageTakingExamPrecalc
* dev.mathops.web.websocket.proctor.MPSEndpoint

PrerequisiteLogic

Does:

* Constructed per student ID
* Can test whether student has satisfied prerequisite for a course or earned credit for a course

Used in:

* dev.mathops.app.adm.student.StudentSummaryPanel
* dev.mathops.app.checkin.LogicCheckinCourseExams
* dev.mathops.app.ops.snapin.messaging.EmailsNeeded
* dev.mathops.app.ops.snapin.messaging.MessagingContext
* dev.mathops.app.ops.snapin.messaging.epf.EPFStudents
* dev.mathops.dbjobs.batch.daily.ImportBannerStudentRegistrations
* dev.mathops.session.sitelogic.mathplan.data.StudentData
* dev.mathops.web.site.admin.office.PageTestingIssueExam
* dev.mathops.web.site.course.CourseMenu
* dev.mathops.web.site.placement.main.PageToolHome
* dev.mathops.web.site.tutorial.elm.PageHome
* dev.mathops.web.site.tutorial.precalc.PageTakingExamPrecalc
* dev.mathops.web.site.tutorial.precalc.PrecalcTutorialSiteLogic
* dev.mathops.web.websocket.proctor.MPSEndpoint

SpecialCategoriesStatus [used only one place – eliminate, or broaden]

Does:

* Data class with factory method taking student ID
* Gathers list of special categories to which student belongs
* Queries list of categories active at a specified date/time

Used in:

* dev.mathops.db.old.logic.PlacementLogic

StandardsMasteryLogic

Does:

* Constructed per student ID and course ID
* Tests whether enough standards have been mastered to pass a course (hard-coded rules)
* Counts total standards and completed standards
* Tests whether an individual standard has been mastered
* Tests which questions within a standard have been passed twice (hard-coded rules)
* Counts or retrieves all standards for which student is eligible to demonstrate mastery

Used in:

* dev.mathops.app.checkin.LogicCheckInCourseExams
* dev.mathops.session.txn.handlers.GetExamHandler

## dev.mathops.session.sitelogic.\*

CourseSiteLogic

Does:

* Constructed for web site profile, session, "ignore OT" flag, and list of courses
* Error message if data gathering fails
* SiteData object:
  + Constructed for DB profile, current date/time, "ignore OT" flag, and list of courses
  + Stores error message if data gathering fails
  + SiteDataContext:
    - Lists of RawCourse, RawCsection
    - Map from RawCSection to RawPacingStructure
  + SiteDataStudent:
    - RawStudent, RawPacingStructure
    - List of RawStetext, etext, course IDs, RawSpecialStus, RawAdminHold, RawStmpe, RawStexam (for ELM), RawMpeCredit, and RawStcourse (OT credit)
  + SiteDataRegistration:
    - Active term
    - Flags: locked out, non-paced Incomplete pending
    - Lists of RawStcourse (completed), RawStcourse (current), RawTerm (terms for current regs), RawStcourse (current, paced), RawFfrTrns
    - List of prerequisites for each registered course
  + SiteDataMilestone:
    - Map from term to RawStterm record
    - Map from term to list of RawMilestone
    - Map from term to list of RawStmilestone
  + SiteDataCourse:
    - Map from course ID to section to SiteDataCfgCourse:
      * RawCourse, RawCsection, RawPacingStructure
      * Flags: must take User's exam, practice mode, open access
    - Map from course ID to ordered list of unit numbers
    - Map from course ID to map from unit number to SiteDataCfgUnit:
      * RawCunit, RawCusection, list of RawExam
    - Map from course ID to map from unit number to objective numbers
    - Map from course ID to map from unit number to map from objective number to SiteDatCfgObjective:
      * RawCuobjective, list of AssignmentRec
  + Stores (and populates) SiteDataActivity:
    - Map from course ID to map from unit to list of RawStexam
    - Map from course ID to map from unit to map from objective to list of RawSthomework
  + Stores (and populates) SiteDataStatus:
    - Map from course ID to SiteDataCfgCourseStatus:
      * Total score
      * Flag: eligible
    - Map from course ID to map from unit to map from exam type to SiteDataCfgExamStatus:
      * Date first passed, "passed on time" flag
      * Highest possible score, mastery score, highest raw score, highest passing score, counted score, on-time points
      * Attempts allowed and used, attempts per passing review, attempts since last passing review
      * Deadline date, last try date, last try attempts allowed, last try attempts used
      * Flag: eligible, synthetic
    - Map from course ID to map from unit to map from objective to map from homework type to SiteDataCfgHwStatus:
      * Flag: eligible
* CourseSiteLogicCourse:
  + Constructed with CourseSiteLogic, SiteData, and session
  + Lists of CourseInfo objects for {available, unavailable, no-prereq, in-progress, completed, past-deadline, forfeit, failed, OT credit} courses
    - Course number, label, and available flag
  + Lists of CourseInfo objects for {available, unavailable, no-prereq, in-progress, completed, past-deadline, forfeit} incompletes
  + Lists of CourseInfo objects for tutorials
  + Flags: locked out, required e-text, blocked, unopened incomplete
  + Number of courses open
  + Map from course ID to course label

Used in:

* dev.mathops.web.site.course.CourseMenu
* dev.mathops.web.site.course.CourseSite
* dev.mathops.web.site.course.PageCalendar
* dev.mathops.web.site.course.PageCourseStatus
* dev.mathops.web.site.course.PageETexts
* dev.mathops.web.site.course.PageGettingHelp
* dev.mathops.web.site.course.PageHome
* dev.mathops.web.site.course.PageHtmlHomework
* dev.mathops.web.site.course.PageHtmlLta
* dev.mathops.web.site.course.PageHtmlPastExam
* dev.mathops.web.site.course.PageHtmlPastLta
* dev.mathops.web.site.course.PageHtmlReviewExam
* dev.mathops.web.site.course.PageHtmlUnitExam
* dev.mathops.web.site.course.PageLesson
* dev.mathops.web.site.course.PageOrientation
* dev.mathops.web.site.course.PageOutline
* dev.mathops.web.site.course.PagePlacementReport
* dev.mathops.web.site.course.PageSchedule
* dev.mathops.web.site.course.PageSkillsReview
* dev.mathops.web.site.course.PageStartCourse
* dev.mathops.web.site.course.PageStdsCourse
* dev.mathops.web.site.course.PageStdsText
* dev.mathops.web.site.course.PageStdsTextMedia
* dev.mathops.web.site.course.PageStrsTextModule
* dev.mathops.web.site.course.PageUsersExam
* dev.mathops.web.site.course.PageVideo

## dev.mathops.session.sitelogic.bogus.\*

ETextLogic [eliminate – grant access to e-text for all courses student has completed]

Does:

* Utility class, not constructed
* Tests whether student can access course by session and course ID
* Updates e-text status on course completion

Used in:

* dev.mathops.session.sitelogic.servlet.StudentCourseStatus
* dev.mathops.web.site.admin.genadmin.PageTestStudent
* dev.mathops.web.site.admin.genadmin.PageOutline

## dev.mathops.session.sitelogic.mathplan.\*

MathPlanLogic

Does:

* Constructed with DbProfile
* Get map from course ID to RawCourse
* Get map from course group code to CourseGroup:
  + Group code, number of credits, lowest last course, list of course numbers
* Gets Major object by program code:
  + Question number, program code, major name, concentration name, catalog URL
  + Flags: auto-check, checkable
* Gets map from Major to MajorMathRequirements:
  + Program code
  + List of critical/recommended/typical courses IDs in semesters 1, 2, and after
* Gets the list of majors that just require AUCC 1B
* Gets the list of majors requiring some Precalculus
* Gets the list of majors requiring Calculus I
* Gets the list of majors requiring Calculus sequence
* Gets map from course ID to list of RequiredPrereq:
  + Course ID, list of prereq courses with required grades and "may be taken concurrently" flags
* Gets a StudentData object based on student ID and session
  + RawStudent
  + Map from question number to RawStmathplan
  + Flags: viewed existing, checked "this is only a recommendation", remedial
  + Lists of LiveCsuCredit, LiveTransferCredit, RawMpeCredit, MajorMathRequirement
  + CourseRecommendations:
    - Critical/recommended/typical CourseSequence:
      * Core CourseGroup
      * CourseInfo objects for courses to complete before arrival
      * CourseInfo or CourseInfoGroup objects for semester 1, 2, and after
      * Flags: majors require variety of Calc I, and variety of Calc II
  + PrerequisiteLogic
  + PlacementStatus
  + ELMTutorialStatus
  + PrecalcTutorialStatus
  + Set of course IDs for which student is eligible to register
  + Number of credits of core completed
  + List of ENextStep
* Gets the list of LiveCsuCredit, LiveTransferCredit, RawStmathplan for a student
* Tests whether (and when) a student completed Math Placement Tool
* Tests whether a student has completed the Math Plan
* Gets math plan status for a student
* Deletes math plan responses for a student
* Store new math plan responses for a student

Used in:

* dev.mathops.app.admin.student.JTableMathPlanResponses
* dev.mathops.app.admin.student.StudentMathPlanPanel
* dev.mathops.session.sitelogic.mathplan.data.CourseGroup
* dev.mathops.session.sitelogic.mathplan.data.CourseRecommendations
* dev.mathops.session.sitelogic.mathplan.data.StudentData
* dev.mathops.web.site.admin.genadmin.student.PageStudentMathPlan
* dev.mathops.web.site.placement.main.PageMissing
* dev.mathops.web.site.placement.main.PagePlanMajors1
* dev.mathops.web.site.placement.main.PagePlanMajors2
* dev.mathops.web.site.placement.main.PagePlanNext
* dev.mathops.web.site.placement.main.PagePlanRecord
* dev.mathops.web.site.placement.main.PagePlanStart
* dev.mathops.web.site.placement.main.PagePlanView
* dev.mathops.web.site.placement.main.PageRamReady
* dev.mathops.web.site.placement.main.PageReviewOutline
* dev.mathops.web.site.placement.main.PageSecureLanding
* dev.mathops.web.site.placement.main.PlacementReport
* dev.mathops.web.site.placement.main.RamReadyService

## dev.mathops.session.sitelogic.servlet.\*

ExamEligibilityTester [seems redundant – replace with type-specific testers?]

Does:

* Constructed per student ID
* Tests whether the student is eligible for an AvailableExam (RawExam + timelimit factor), accumulates a list of reasons if not, retrieves the list of holds on the student account.

Used in:

* dev.mathops.session.txn.handlers.GetExamHandler
* dev.mathops.web.site.html.unitexam.UnitExamSession

FinalExamEligibilityTester [used only one place – eliminate, or broaden]

Does:

* Constructed per student ID
* Tests whether the student is eligible for a FinalExamAvailability (Course ID and unit), accumulates a list of reasons if not, retrieves the list of holds on the student account.

Used in:

* dev.mathops.web.websocket.proctpr.MPSEndpoint

HomeworkligibilityTester

Does:

* Constructed per student ID
* Tests whether the student is eligible for an AssignmentRec, accumulates a list of reasons if not, retrieves the list of holds on the student account.

Used in:

* dev.mathops.session.txn.handlers.GetHomeworkHandler
* dev.mathops.web.site.course.PageStdsCourse
* dev.mathops.web.site.html.hw.HomeworkSession

LtaEligibilityTester [used only one place – eliminate, or broaden]

Does:

* Constructed per student ID
* Tests whether the student is eligible for a learning target assignment, accumulates a list of reasons if not, retrieves the list of holds on the student account.

Used in:

* dev.mathops.web.site.html.lta.LtaSession

ReviewExamEligibilityTester

Does:

* Constructed per student ID
* Tests whether the student is eligible for an AvailableExam (RawExam + timelimit factor), accumulates a list of reasons if not, retrieves the list of holds on the student account.

Used in:

* dev.mathops.session.txn.handlers.GetReviewExamHandler
* dev.mathops.web.site.html.reviewexam.ReviewExamSession

StandardMasteryEligibilityTester [not used...]

Does:

* Utility class, not constructed
* Tests whether the student is eligible to master a standard based on current date/time, RawStcourse, RawStudent, ResolvedStandardMilestones, unit, and objective, and accumulates a list of reasons if not, retrieves the list of holds on the student account.

Used in:

* (none)

UnitExamEligibilityTester

Does:

* Constructed per student ID
* Tests whether the student is eligible for a UnitExamAvailability (course + unit), accumulates a list of reasons if not, retrieves the list of holds on the student account.

Used in:

* dev.mathops.web.site.html.unitexam.UnitExamSession
* dev.mathops.web.websocket.proctor.MPSEndpoint