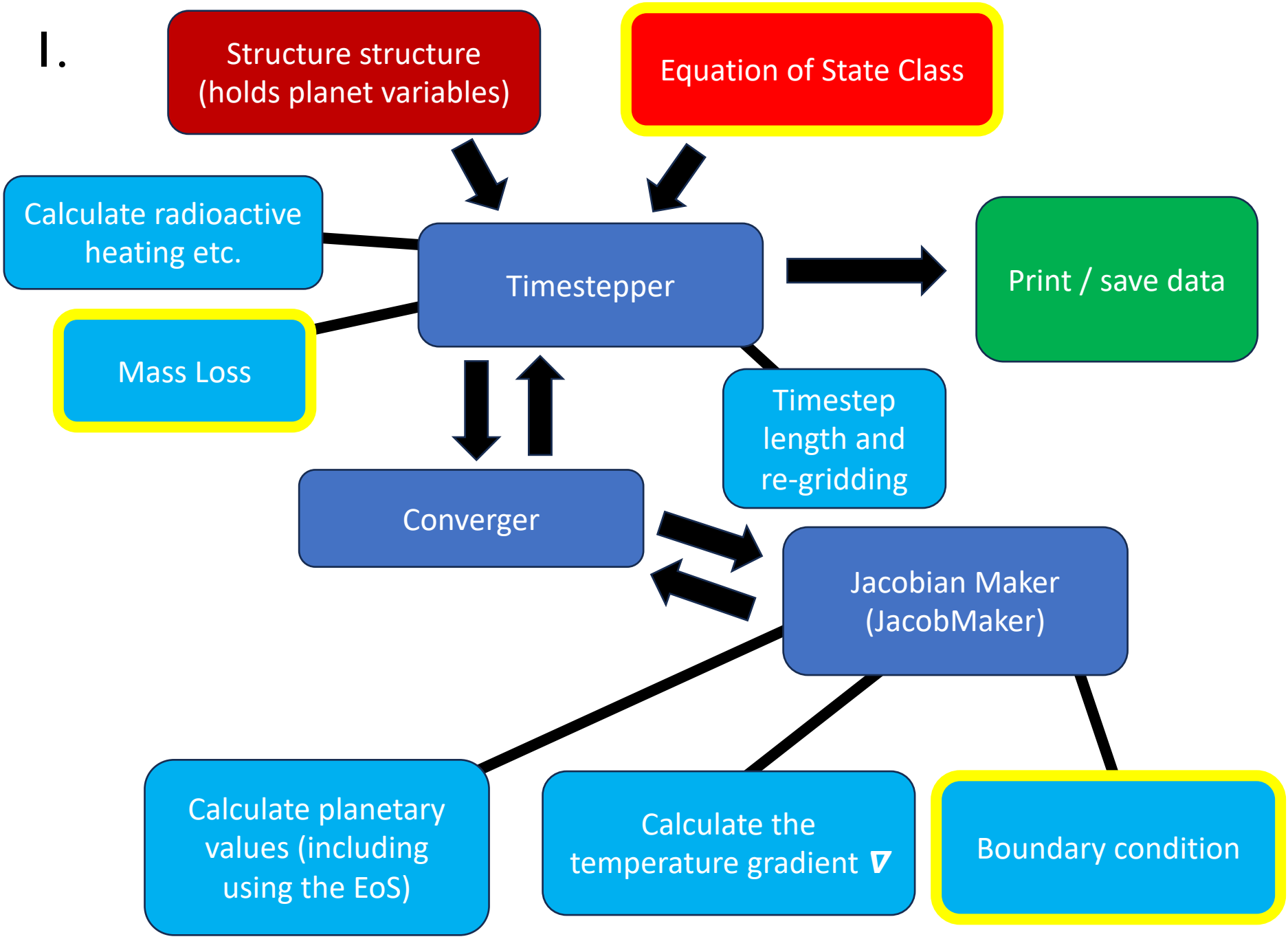
STEREO-D

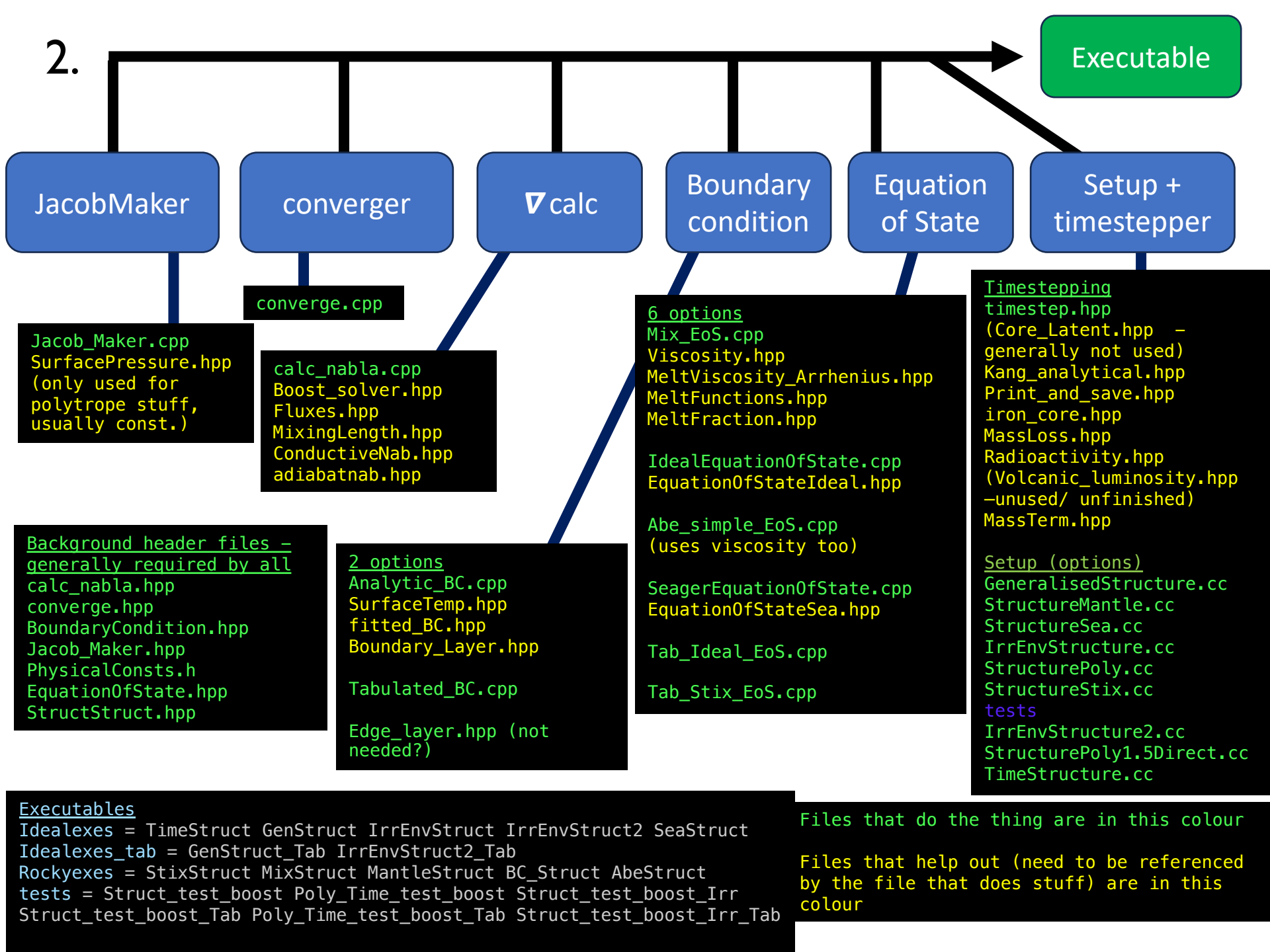
Structural & Thermal Evolution of Rocky Exoplanets in One-D

Schematics

1. Diagram of how the software communicates with itself for the numerical method
2. Diagram of how the code is compiled (with makefile), including the names of files and options

I.


Structure structure (holds planet variables)
Equation of State Class
Calculate radioactive heating etc.
Timestepper
Print / save data
Mass Loss
Timestep length and re-gridding
Converger
Jacobian Maker (JacobMaker)
Calculate planetary values (including using the EoS)
Calculate the temperature gradient ∇
Boundary condition


2.
Executable
JacobMaker
converger
∇ calc
Boundary condition
Equation of State
Setup + timestepper
Jacob_Maker.cpp
SurfacePressure.hpp
(only used for polytrope stuff, usually const.)
converge.cpp
calc_nabla.cpp
Boost_solver.hpp
Fluxes.hpp
MixingLength.hpp
ConductiveNab.hpp
adiabatnab.hpp
6 options
Mix_EoS.cpp
Viscosity.hpp
MeltViscosity_Arrhenius.hpp
MeltFunctions.hpp
MeltFraction.hpp
IdealEquationOfState.cpp
EquationOfStateIdeal.hpp
Abe_simple_EoS.cpp
(uses viscosity too)
SeagerEquationOfState.cpp
EquationOfStateSea.hpp
Tab_Ideal_EoS.cpp
Tab_Stix_EoS.cpp
Timestepping
timestep.hpp
(Core_Latent.hpp – generally not used)
Kang_analytical.hpp
Print_and_save.hpp
iron_core.hpp
MassLoss.hpp
Radioactivity.hpp
(Volcanic_luminosity.hpp –unused/ unfinished)
MassTerm.hpp
Setup (options)
GeneralisedStructure.cc
StructureMantle.cc
StructureSea.cc
IrrEnvStructure.cc
StructurePoly.cc
StructureStix.cc
tests
IrrEnvStructure2.cc
StructurePoly1.5Direct.cc
TimeStructure.cc
Background header files – generally required by all
calc_nabla.hpp
converge.hpp
BoundaryCondition.hpp
Jacob_Maker.hpp
PhysicalConsts.h
EquationOfState.hpp
StructStruct.hpp
2 options
Analytic_BC.cpp
SurfaceTemp.hpp
fitted_BC.hpp
Boundary_Layer.hpp
Tabulated_BC.cpp
Edge_layer.hpp (not needed?)
Executables
Idealexes = TimeStruct GenStruct IrrEnvStruct IrrEnvStruct2 SeaStruct
Idealexes_tab = GenStruct_Tab IrrEnvStruct2_Tab
Rockyexes = StixStruct MixStruct MantleStruct BC_Struct AbeStruct
tests = Struct_test_boost Poly_Time_test_boost Struct_test_boost_Irr Struct_test_boost_Tab Poly_Time_test_boost_Tab Struct_test_boost_Irr_Tab
Files that do the thing are in this colour
Files that help out (need to be referenced by the file that does stuff) are in this colour