Framework layer User layer «implicit interface» «implicit interface» «template» «template» Tree<NodeType, LengthType> TraversalSpecification<TreeType> ThreePointMultivariate protected fields: protected fields: # ref_tree_: TreeType const& # num tips: uint # num_nodes_: uint # id parent : uvec public typedefs: **ThreePointUnivariate** # id child nodes: vector<uvec> + «i» TreeTvpe # lengths_: vector<LengthType> + «i» AlgorithmType # map node to id: + «i» ParameterType unordered_map<NodeType, uint> + «i» DataType # map id to node : vector<NodeType> + «i» StateType **ThreePointPBM** public typedefs: public constructor: **ThreePointPMM** + «i» NodeTvpe + «i» TraversalSpecification(+ «i» LengthType tree: TreeType &, **ThreePointPOUMM** input_data: DataType &) public constructor: + «i» Tree(public methods: branch start nodes: vector<NodeType> const&, + «i» SetParameter(par: ParameterType &) branch end nodes: vector<NodeType> const&, + «i» InitNode(i: uint): void branch lengths: vector<LengthType> consi&) + «i» VisitNode(i: uint): void + «i» PruneNode(i: uint, i parent: uint): void public methods: + «i» StateAtRoot(): StateType «template» + «i» FindNodeWithId(i: uint): NodeType const& «runtime-entry-point-object» + «i» FindIdOfNode(node: NodeType const&): uint TraversalTask<TraversalSpecification> + «i» LengthOfBranch(i: uint): LengthType const& + «i» FindIdOfParent(id_child: uint): uint protected fields: + «i» FindChildren(i: uint): uvec const& # spec_: TraversalSpecification + «i» OrderNodes(nodes: vector<NodeTyce> const&): «implicit interface» uvec # tree_: TraversalSpecification::TreeType «template» TraversalAlgorithm<TreeType> # algorithm: TraversalSpecification::AlgorithrnType protected fields: ref spec : TraversalSpec & ref_tree : TraversalSpec::TreeType const& public constructor: «implicit interface» + TraversalTask(«template» public typedefs: branch start nodes: vector<NodeType> const&, OrderedTree<NodeType, LengthType> + «i» ModeType branch end nodes: vector<NodeType> const&, lengths: vector<LengthType> const&, protected fields: public constructor: input data: # ranges id visit : uvec + «i» TraversalAlgorithm(TraversalSpecificcation::DataType const&) # ranges id prune : uvec tree: TraversalSpec::TreeType const &, spec: TraversalSpec &) public properties (access to components): public constructor: + spec: TraversalSpecification & + OrderedTree(public methods: + tree: TraversalSpecification::TreeType & branch start nodes: vector<NodeType> const&, + «i» TraverseTree(mode: ModeType): void + algorithm: TraversalSpecification::AlgorithmType& branch end nodes: vector<NodeType> const&, branch lengths: vector<LengthType> const&) public methods: + TraverseTree(public methods: par: TraversalSpecification::ParameterType const&, + «i» RangeldVisitNode(i level: uint): pair<uint,uint> mode: uint): TraversalSpecification::StateType + «i» RangeldPruneNode(i step: uint): pair<uint,uint> **PreOrderTraversal** PostOrderTraversal