

What is claimed is:

1. A method, performed by one or more data processing apparatus, for encoding a rule set for transforming data, including:
 - receiving a rule set including a sequence of execution cases, at least one execution case in the sequence of the execution cases including one or more trigger conditions and a specification of an output that is to be generated when the one or more trigger conditions are all satisfied;
 - generating a control structure including a sequence of rows corresponding to one or more execution cases in the rule set, each row including: a sequence of one or more trigger conditions and information specifying the output for a corresponding execution case, wherein the generated control structure is configured to direct processing to continue at a different row when one of the trigger conditions is failed and wherein the generated control structure is configured such that, for at least one of the trigger conditions in the control structure, when the at least one of the trigger conditions is failed, the control structure will direct processing to skip at least one row in the sequence of rows; and
 - storing or transmitting the control structure.
2. The method of claim 1, further including:
 - receiving input data;
 - checking trigger conditions against the input data in a sequence determined using the control structure; and
 - storing or transmitting data based on an output specified by the control structure.
3. The method of claim 1, in which at least one of the rows omits a trigger condition for the corresponding execution case, where the omitted trigger condition occurs in an execution case prior to the corresponding execution case in the sequence of execution cases.

4. The method of claim 1, in which the sequence of trigger conditions in a row is a sequence of portions of code that each direct processing to a trigger condition in a list of unique trigger conditions from the rule set.

5. The method of claim 1, in which the information specifying the output in a row is a portion of code that directs processing to an output expression in a list of unique outputs from the rule set.

6. The method of claim 1, further including:
sorting the sequence of trigger conditions for a row based on a different row to which processing will be directed when a trigger condition in the sequence fails during processing of data.

7. The method of claim 1, further including:
sorting the sequence of trigger conditions for a row based on execution times for the trigger conditions.

8. The method of claim 7, further including:
receiving input data;
checking trigger conditions against the input data in a sequence determined using the control structure;
updating the execution time for a trigger condition in the list of unique trigger conditions based on the time it takes to execute the trigger condition with the input data;
and
sorting the pointers to trigger conditions for a row in the control structure based on the updated execution time.

9. The method of claim 1, further including:
sorting the sequence of trigger conditions for a row based on failure rates for the trigger conditions.

10. The method of claim 9, further including:
receiving input data;
checking trigger conditions against the input data in a sequence determined using the control structure;
updating the failure rate for a trigger condition in the list of unique trigger conditions based on whether the trigger condition is satisfied by a record in the input data; and
sorting the pointers to trigger conditions for a row in the control structure based on the updated failure rate.

11. The method of claim 1, wherein a row of the control structure further includes a portion of code that directs processing to a different row of the control structure that is to be processed next when all of the trigger conditions for the row are satisfied.

12. The method of claim 1, wherein the rule set is specified through a graphical user interface.

13. The method of claim 1, wherein at least two trigger conditions for an execution case in the rule set are combined and represented by a single trigger condition in the control structure.

14. The method of claim 1, wherein at least two outputs for different execution cases in the rule set are combined and represented by a single output expression in a row of the control structure.

15. The method of claim 1, wherein the control structure is an acyclic directed graph with nodes corresponding to the trigger conditions and output expressions in the rows of the control structure.

16. A computer-readable medium storing software for encoding a rule set for transforming data, the software including instructions for causing a computing system to:
receive a rule set including a sequence of execution cases, at least one execution case in the sequence of the execution cases including one or more trigger conditions and a specification of an output that is to be generated when the one or more trigger conditions are all satisfied;

generate a control structure including a sequence of rows corresponding to one or more execution cases in the rule set, each row including: a sequence of one or more trigger conditions and information specifying the output for a corresponding execution case, wherein the generated control structure is configured to, during future processing to transform input data, direct processing to continue at a different row when one of the trigger conditions is failed and wherein the generated control structure is configured such that, for at least one of the trigger conditions in the control structure, when the at least one of the trigger conditions is failed, the control structure will direct processing to skip at least one row in the sequence of rows; and

store or transmit the control structure.

17. The medium of claim 16, including instructions for causing a computing system to:

receive input data;

check trigger conditions against the input data in a sequence determined using the control structure; and

store or transmit data based on an output specified by the control structure.

18. The medium of claim 16, in which at least one of the rows omits a trigger condition for the corresponding execution case, where the omitted trigger condition occurs in an execution case prior to the corresponding execution case in the sequence of execution cases.

19. The medium of claim 16, in which the sequence of trigger conditions in a row is a sequence of portions of code that each direct processing to a trigger condition in a list of unique trigger conditions from the rule set.

20. The medium of claim 16, in which the information specifying the output in a row is a portion of code that directs processing to an output expression in a list of unique outputs from the rule set.

21. The medium of claim 16, including instructions for causing a computing system to:
sort the sequence of trigger conditions for a row based on a different row to which processing will be directed when a trigger condition in the sequence fails during processing of data.

22. The medium of claim 16, including instructions for causing a computing system to:
sort the sequence of trigger conditions for a row based on execution times for the trigger conditions.

23. The medium of claim 22, including instructions for causing a computing system to:
receive input data;
check trigger conditions against the input data in a sequence determined using the control structure;
update the execution time for a trigger condition in the list of unique trigger conditions based on the time it takes to execute the trigger condition with the input data;
and
sort the pointers to trigger conditions for a row in the control structure based on the updated execution time.

24. The medium of claim 16, including instructions for causing a computing system to:

sort the sequence of trigger conditions for a row based on failure rates for the trigger conditions.

25. The medium of claim 24, including instructions for causing a computing system to:

receive input data;

check trigger conditions against the input data in a sequence determined using the control structure;

update the failure rate for a trigger condition in the list of unique trigger conditions based on whether the trigger condition is satisfied by a record in the input data; and

sort the pointers to trigger conditions for a row in the control structure based on the updated failure rate.

26. The medium of claim 16, wherein a row of the control structure further includes a portion of code that directs processing to a different row of the control structure that is to be processed next when all of the trigger conditions for the row are satisfied.

27. The medium of claim 16, wherein the rule set is specified through a graphical user interface.

28. The medium of claim 16, wherein at least two trigger conditions for an execution case in the rule set are combined and represented by a single trigger condition in the control structure.

29. The medium of claim 16, wherein at least two outputs for different execution cases in the rule set are combined and represented by a single output expression in a row of the control structure.

30. The medium of claim 16, wherein the control structure is an acyclic directed graph with nodes corresponding to the trigger conditions and output expressions in the rows of the control structure.

31. A computing system for encoding a rule set for transforming data, the computing system including:

- an input device or port configured to receive a rule set including a sequence of execution cases, at least one execution case in the sequence of the execution cases including one or more trigger conditions and a specification of an output that is to be generated when the one or more trigger conditions are all satisfied; and

- at least one processor configured to perform operations, the operations including generating a control structure including a sequence of rows corresponding to one or more execution cases in the rule set, each row including: a sequence of one or more trigger conditions and information specifying the output for a corresponding execution case, wherein the generated control structure is configured to, during future processing to transform input data, direct processing to continue at a different row when one of the trigger conditions is failed and wherein the generated control structure is configured such that, for at least one of the trigger conditions in the control structure, when the at least one of the trigger conditions is failed, the control structure will direct processing to skip at least one row in the sequence of rows; and

- an output device or port configured to transmit the control structure.

32. The system of claim 31, including:

- an input device or port configured to receive input data;

- at least one processor configured to perform operations, the operations including checking trigger conditions against the input data in a sequence determined using the control structure; and

an output device or port configured to transmit data based on an output specified by the control structure.

33. The system of claim 31, in which at least one of the rows omits a trigger condition for the corresponding execution case, where the omitted trigger condition occurs in an execution case prior to the corresponding execution case in the sequence of execution cases.

34. The system of claim 31, in which the sequence of trigger conditions in a row is a sequence of portions of code that each direct processing to a trigger condition in a list of unique trigger conditions from the rule set.

35. The system of claim 31, in which the information specifying the output in a row is a portion of code that directs processing to an output expression in a list of unique outputs from the rule set.

36. The system of claim 31, in which the operations further include:
sorting the sequence of trigger conditions for a row based on a different row to which processing will be directed when a trigger condition in the sequence fails during processing of data.

37. The system of claim 31, in which the operations further include:
sorting the sequence of trigger conditions for a row based on execution times for the trigger conditions.

38. The system of claim 37, in which the operations further include:
receiving input data;
checking trigger conditions against the input data in a sequence determined using the control structure;

updating the execution time for a trigger condition in the list of unique trigger conditions based on the time it takes to execute the trigger condition with the input data; and

sorting the pointers to trigger conditions for a row in the control structure based on the updated execution time.

39. The system of claim 31, in which the operations further include:
sorting the sequence of trigger conditions for a row based on failure rates for the trigger conditions.

40. The system of claim 39, in which the operations further include:
receiving input data;
checking trigger conditions against the input data in a sequence determined using the control structure;
updating the failure rate for a trigger condition in the list of unique trigger conditions based on whether the trigger condition is satisfied by a record in the input data; and
sorting the pointers to trigger conditions for a row in the control structure based on the updated failure rate.

41. The system of claim 31, wherein a row of the control structure further includes a portion of code that directs processing to a different row of the control structure that is to be processed next when all of the trigger conditions for the row are satisfied.

42. The system of claim 31, wherein the rule set is specified through a graphical user interface.

43. The system of claim 31, wherein at least two trigger conditions for an execution case in the rule set are combined and represented by a single trigger condition in the control structure.

44. The system of claim 31, wherein at least two outputs for different execution cases in the rule set are combined and represented by a single output expression in a row of the control structure.

45. The system of claim 31, wherein the control structure is an acyclic directed graph with nodes corresponding to the trigger conditions and output expressions in the rows of the control structure.

46. A computing system for encoding a rule set for transforming data, the computing system including:

an input device or port configured to receive a rule set including a sequence of execution cases, at least one execution case in the sequence of the execution cases including one or more trigger conditions and a specification of an output that is to be generated when the one or more trigger conditions are all satisfied;

means for generating a control structure including a sequence of rows corresponding to one or more execution cases in the rule set, each row including: a sequence of one or more trigger conditions and information specifying the output for a corresponding execution case, wherein the generated control structure is configured to, during future processing to transform input data, direct processing to continue at a different row when one of the trigger conditions is failed and wherein the generated control structure is configured such that, for at least one of the trigger conditions in the control structure, when the at least one of the trigger conditions is failed, the control structure will direct processing to skip at least one row in the sequence of rows; and a data storage system configured to store the control structure.

47. The system of claim 46, including:
an input device or port configured to receive input data;

at least one processor configured to perform operations, the operations including checking trigger conditions against the input data in a sequence determined using the control structure; and

an output device or port configured to transmit data based on an output specified by the control structure.

48. The system of claim 46, in which at least one of the rows omits a trigger condition for the corresponding execution case, where the omitted trigger condition occurs in an execution case prior to the corresponding execution case in the sequence of execution cases.

49. The system of claim 46, in which the sequence of trigger conditions in a row is a sequence of portions of code that each direct processing to a trigger condition in a list of unique trigger conditions from the rule set.

50. The system of claim 46, in which the information specifying the output in a row is a portion of code that directs processing to an output expression in a list of unique outputs from the rule set.

51. The system of claim 46, including:
means for sorting the sequence of trigger conditions for a row based on a different row to which processing will be directed when a trigger condition in the sequence fails during processing of data.

52. The system of claim 46, including:
means for sorting the sequence of trigger conditions for a row based on execution times for the trigger conditions.

53. The system of claim 52, including:
an input device or port configured to receive input data;

at least one processor configured to perform operations, the operations including:
checking trigger conditions against the input data in a sequence
determined using the control structure; and
updating the execution time for a trigger condition in the list of unique
trigger conditions based on the time it takes to execute the trigger condition with the
input data; and
means for sorting the pointers to trigger conditions for a row in the control
structure based on the updated execution time.

54. The system of claim 46, including:
means for sorting the sequence of trigger conditions for a row based on failure
rates for the trigger conditions.

55. The system of claim 54, in which the operations further include:
an input device or port configured to receive input data;
at least one processor configured to perform operations, the operations including:
checking trigger conditions against the input data in a sequence
determined using the control structure; and
updating the failure rate for a trigger condition in the list of unique trigger
conditions based on whether the trigger condition is satisfied by a record in the input
data; and
means for sorting the pointers to trigger conditions for a row in the control
structure based on the updated failure rate.

56. The system of claim 46, wherein a row of the control structure further
includes a portion of code that directs processing to a different row of the control
structure that is to be processed next when all of the trigger conditions for the row are
satisfied.

57. The system of claim 46, wherein the rule set is specified through a
graphical user interface.

58. The system of claim 46, wherein at least two trigger conditions for an execution case in the rule set are combined and represented by a single trigger condition in the control structure.

59. The system of claim 46, wherein at least two outputs for different execution cases in the rule set are combined and represented by a single output expression in a row of the control structure.

60. The system of claim 46, wherein the control structure is an acyclic directed graph with nodes corresponding to the trigger conditions and output expressions in the rows of the control structure.