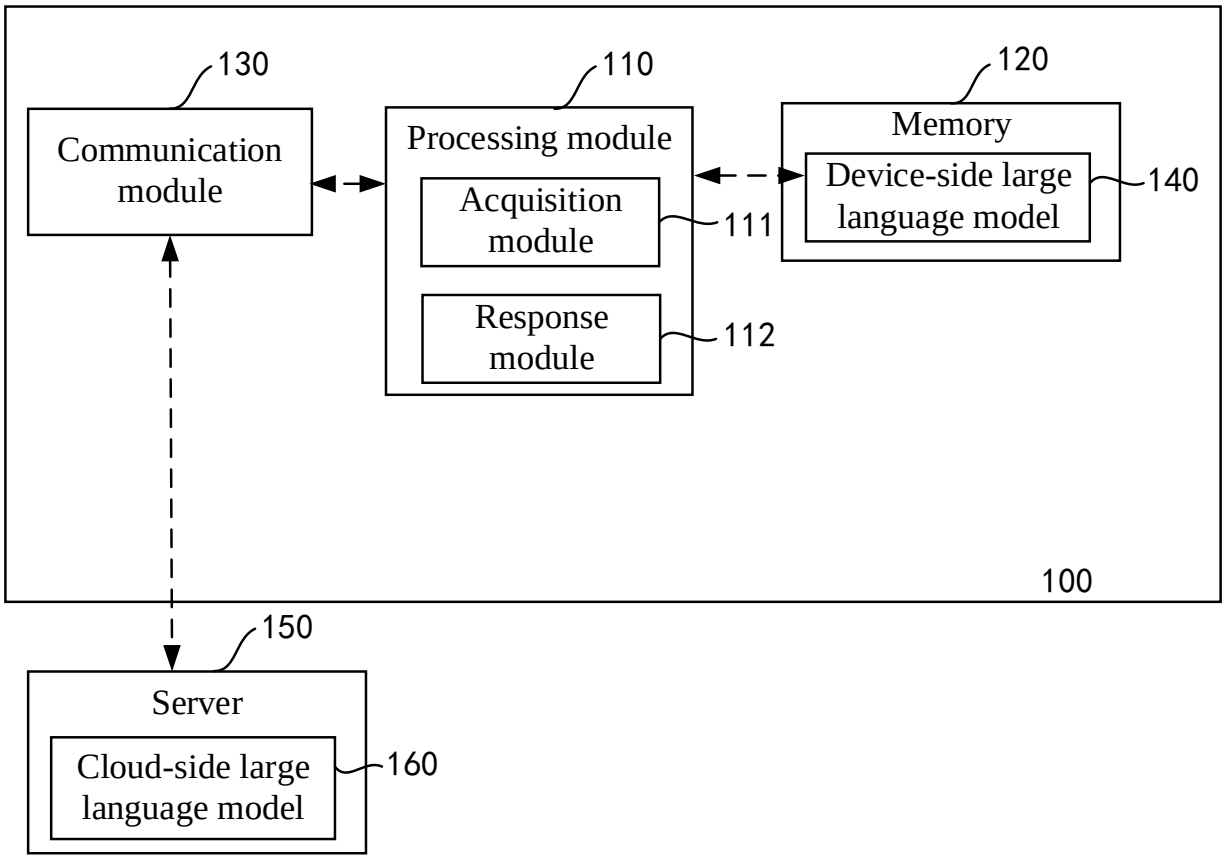

130
Communication module
110
Processing module
Acquisition module
111
Response module
112
120
Memory
Device-side large language model
140
100
150
Server
Cloud-side large language model
160

FIG. 1

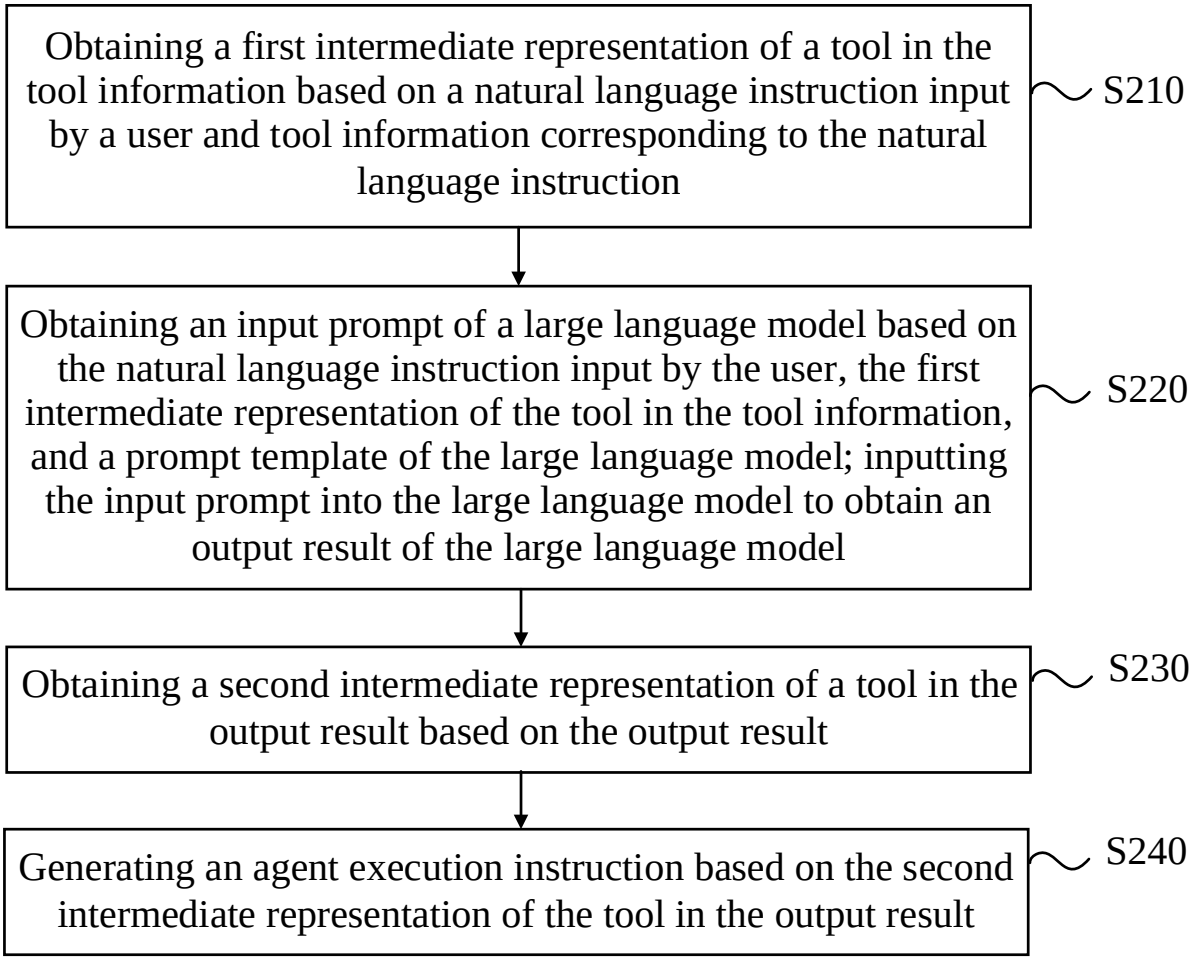

Obtaining a first intermediate representation of a tool in the tool information based on a natural language instruction input by a user and tool information corresponding to the natural language instruction
S210
Obtaining an input prompt of a large language model based on the natural language instruction input by the user, the first intermediate representation of the tool in the tool information, and a prompt template of the large language model; inputting the input prompt into the large language model to obtain an output result of the large language model
S220
Obtaining a second intermediate representation of a tool in the output result based on the output result
S230
Generating an agent execution instruction based on the second intermediate representation of the tool in the output result
S240

FIG. 2

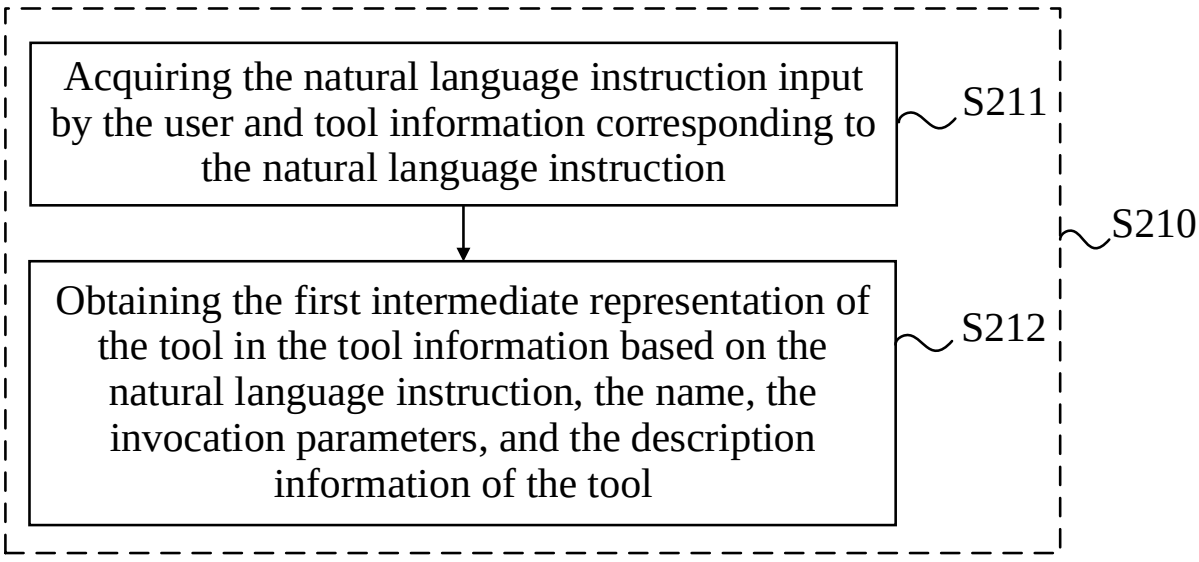

Acquiring the natural language instruction input by the user and tool information corresponding to the natural language instruction
S211
Obtaining the first intermediate representation of the tool in the tool information based on the natural language instruction, the name, the invocation parameters, and the description information of the tool
S212
S210

FIG. 3

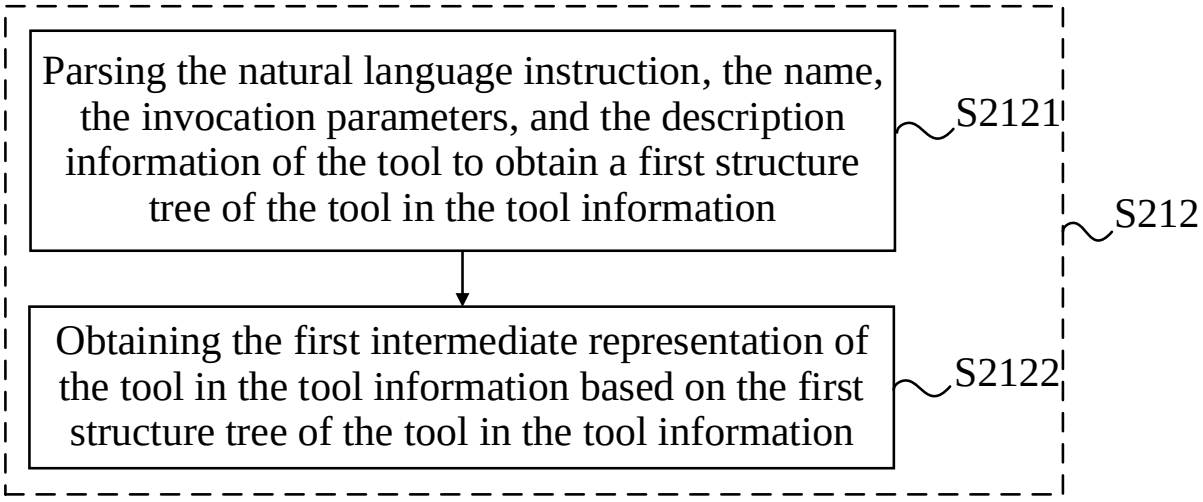

Parsing the natural language instruction, the name, the invocation parameters, and the description information of the tool to obtain a first structure tree of the tool in the tool information
S2121
Obtaining the first intermediate representation of the tool in the tool information based on the first structure tree of the tool in the tool information
S2122
S212

FIG. 4

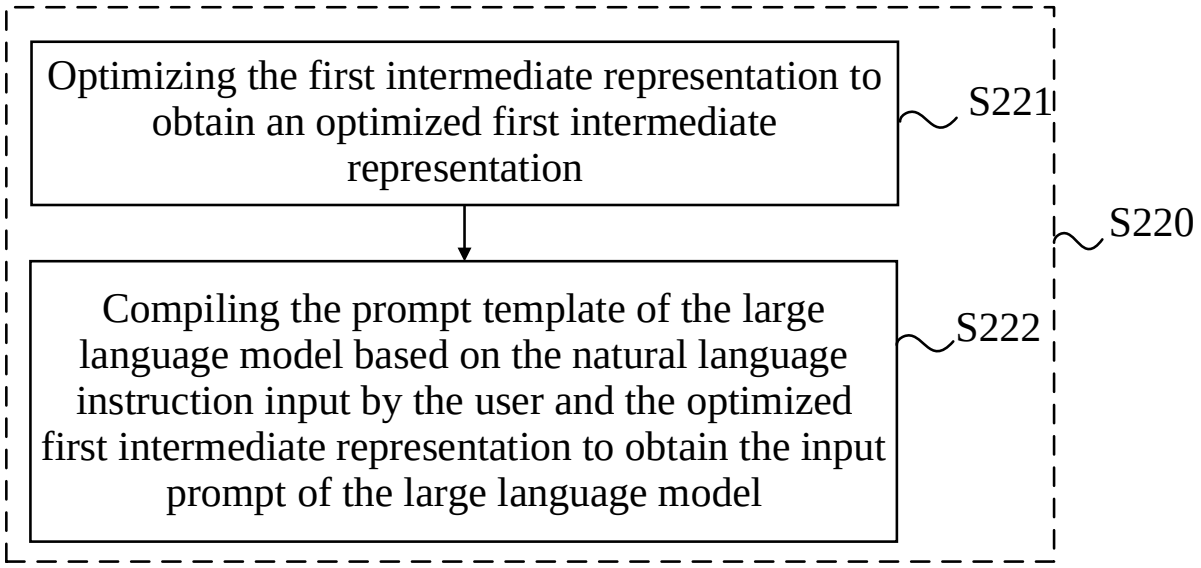

Optimizing the first intermediate representation to obtain an optimized first intermediate representation
S221
Compiling the prompt template of the large language model based on the natural language instruction input by the user and the optimized first intermediate representation to obtain the input prompt of the large language model
S222
S220

FIG. 5

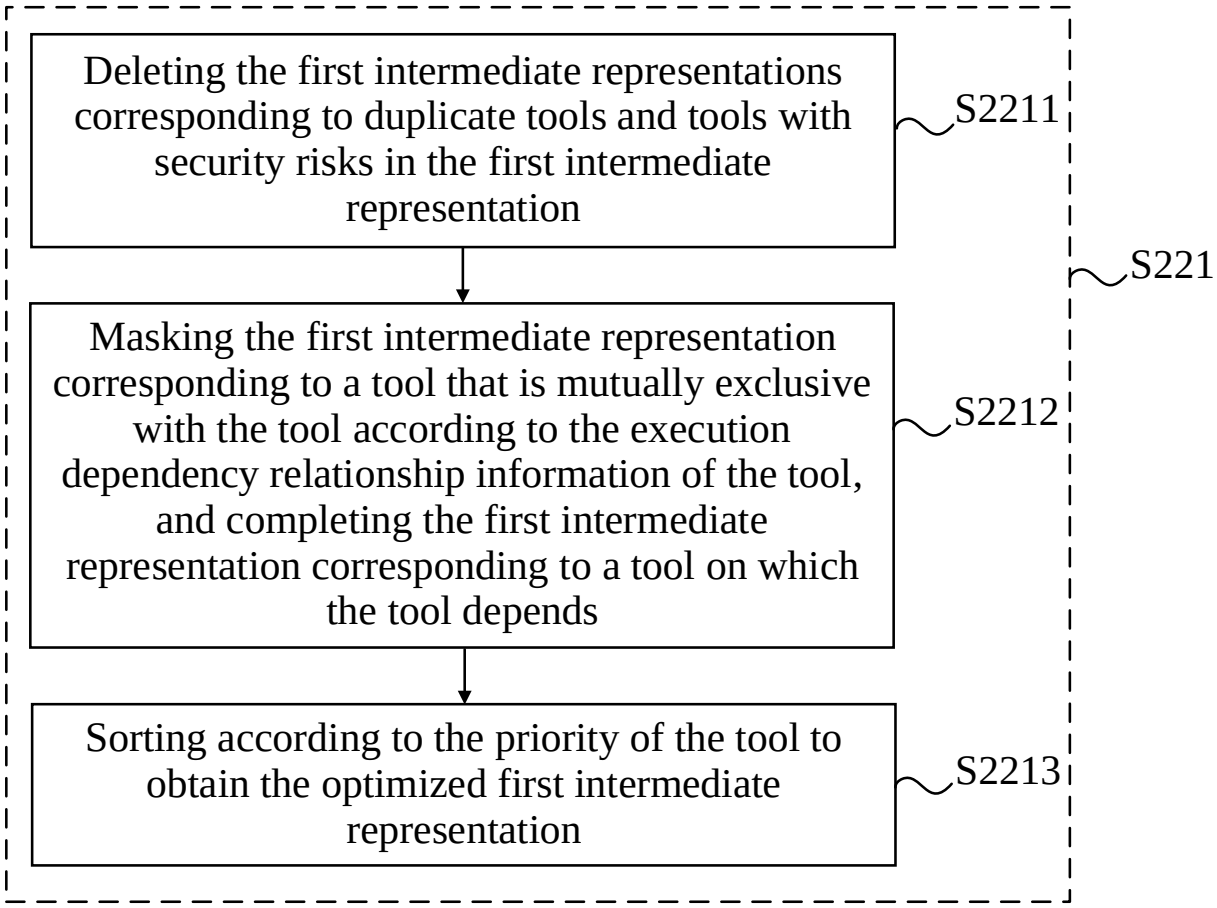

Deleting the first intermediate representations corresponding to duplicate tools and tools with security risks in the first intermediate representation
S2211
Masking the first intermediate representation corresponding to a tool that is mutually exclusive with the tool according to the execution dependency relationship information of the tool, and completing the first intermediate representation corresponding to a tool on which the tool depends
S2212
Sorting according to the priority of the tool to obtain the optimized first intermediate representation
S2213
S221

FIG. 6

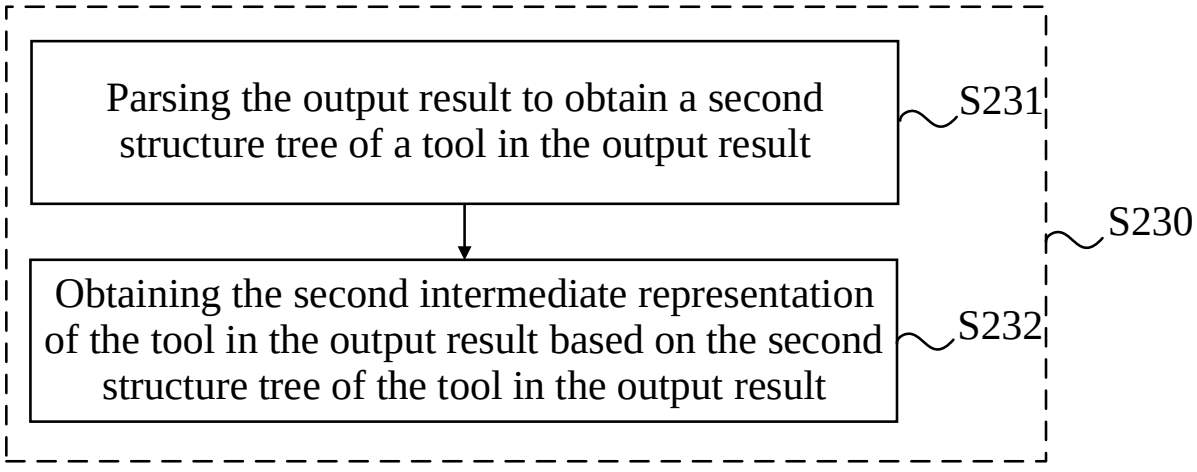

Parsing the output result to obtain a second structure tree of a tool in the output result
S231
Obtaining the second intermediate representation of the tool in the output result based on the second structure tree of the tool in the output result
S232
S230

FIG. 7

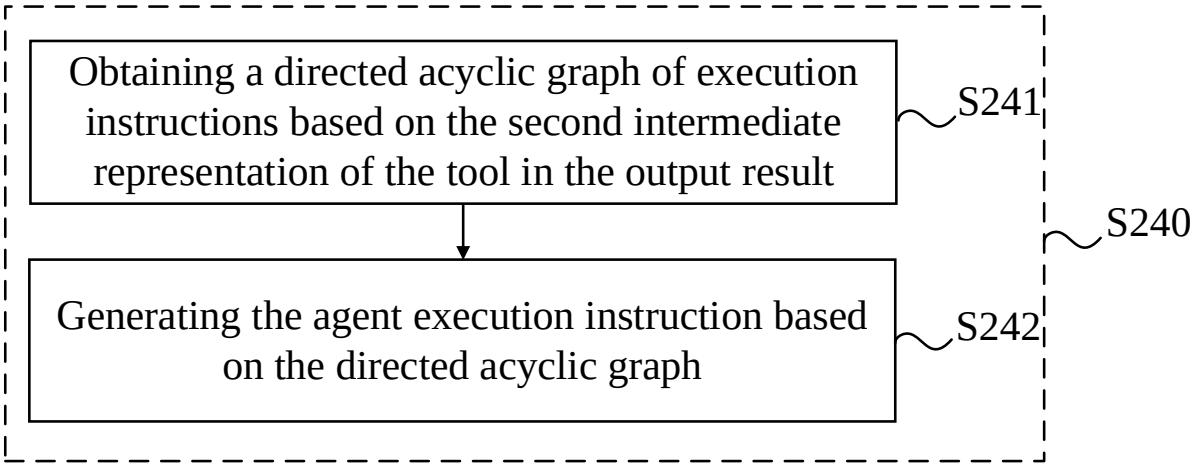

Obtaining a directed acyclic graph of execution instructions based on the second intermediate representation of the tool in the output result
S241
Generating the agent execution instruction based on the directed acyclic graph
S242
S240

FIG. 8

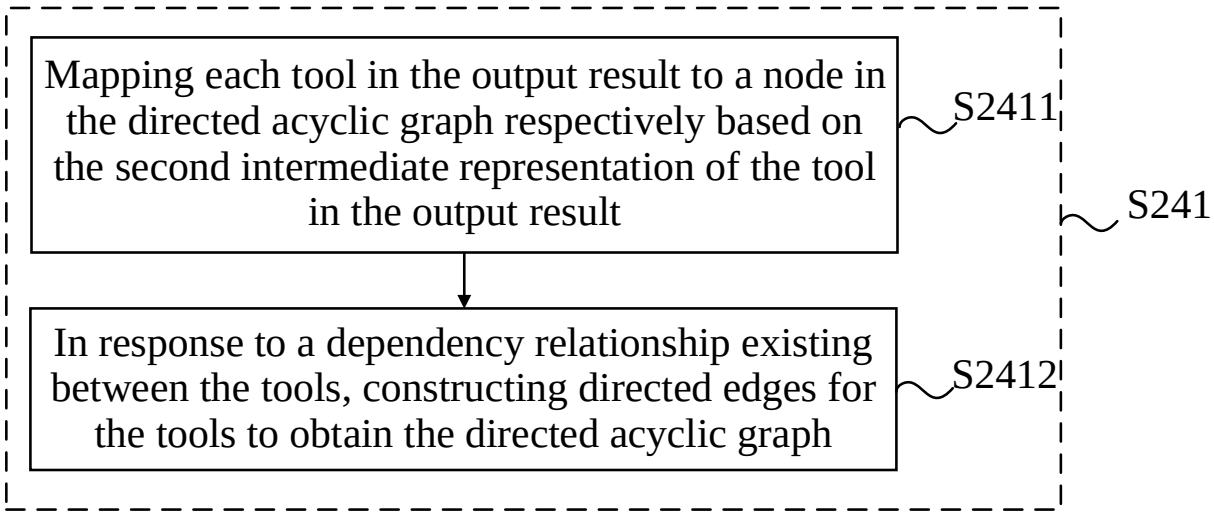

Mapping each tool in the output result to a node in the directed acyclic graph respectively based on the second intermediate representation of the tool in the output result
S2411
In response to a dependency relationship existing between the tools, constructing directed edges for the tools to obtain the directed acyclic graph
S2412
S241

FIG. 9

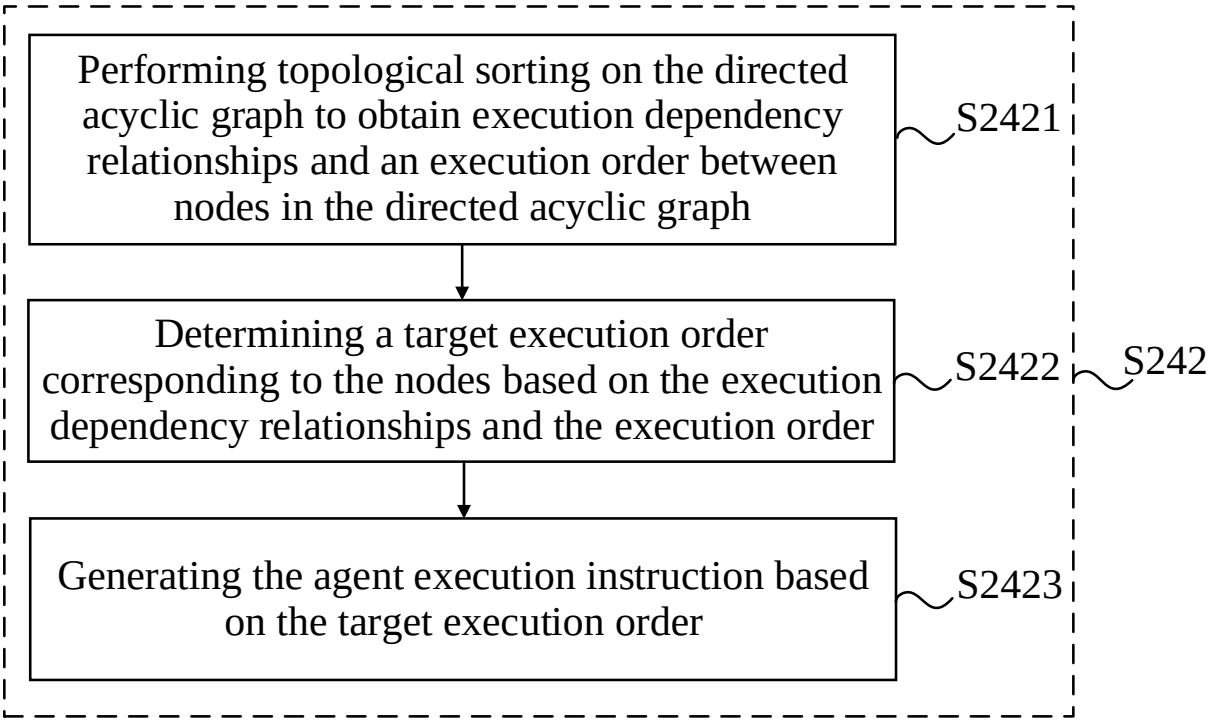

Performing topological sorting on the directed acyclic graph to obtain execution dependency relationships and an execution order between nodes in the directed acyclic graph
S2421
Determining a target execution order corresponding to the nodes based on the execution dependency relationships and the execution order
S2422
S242
Generating the agent execution instruction based on the target execution order
S2423

FIG. 10

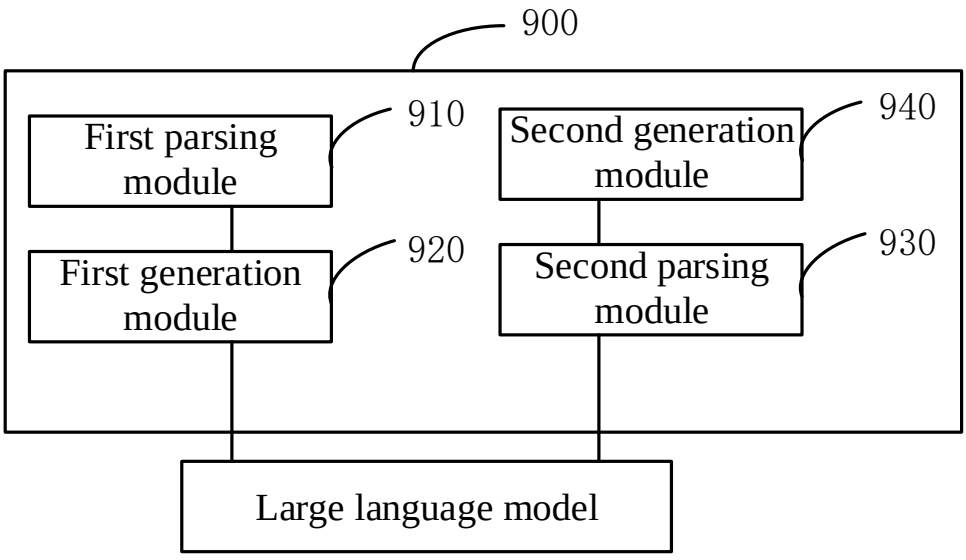

900
First parsing module
910
Second generation module
940
First generation module
920
Second parsing module
930
Large language model

FIG. 11

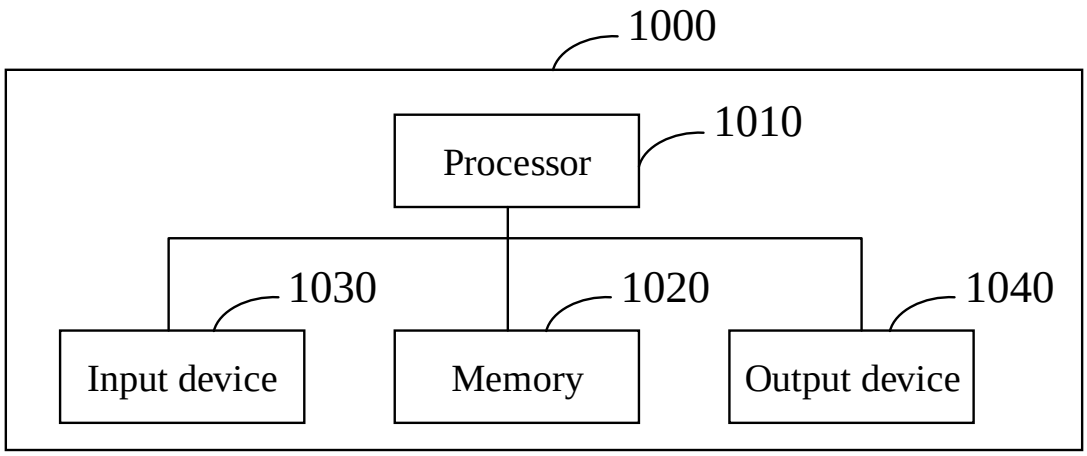

1000
Processor
1010
1030
1020
1040
Input device
Memory
Output device

FIG. 12