

Action Data Table (ADT)		
HEADER		
Name	Description	Type
Instruction	Textual instruction as given in instruction sheet	text ¹
Action	Action type (name, same as above, verb)	string
Reference frame	Symbolic name of the reference frame	string
Action core link	Pointer to the Action Core (when the Action Core for the specific action is present)	pointer to Action Core library
Action generalization parameters 1) names 2) values	Here names and values of parameters important for action generalization are provided (e.g. "peg length", 10.5 cm; peg length is important when executing "peg in hole" operation)	For each parameter: 1) string 2) real number
Context description 1) contextual object name 2) contextual object location 3) No of contextual objects	Names, symbolic locations and number of contextual objects important for the action execution.	For each sort of contextual objects: 1) string 2) string 3) integer number
Robot hardware 1) robot arm type 2) DOF 3) gripper type 4) no of fingers 5) finger shape	Here hardware details for the robot arm and hand are provided	1) string 2) integer number 3) integer number 4) 5 real numbers
Cameras 1) type 2) position 4) gaze direction	Description of camera type, position in respect to the reference frame, as well as camera gaze direction	1) string 2) 3 real numbers 3) 3 real numbers
Main object	Object name (noun)	String
Main Object Descriptors: 1) CAD model 2) pose 3) part constitution 4) material 5) size 6) mass	Robotics relevant object description: 1) 3D model (CAD /pointcloud) or a list of models (alternatively, image or a list of images) 2) Pose 3) Part graph and part models 4) symbolic notation of material object is made of 5) Approximate size in meters 6) Approx mass in kg.	1) pointers array to CAD and image library 2) 7 real numbers for pose 3) pointers to files 4) text 5) 3 real numbers 6) real number
Primary object	Object name (noun)	string
Primary Object Descriptors: same as "Main object descriptors"		
Secondary object	Object name (noun)	string
Secondary Object Descriptors: same as "Main object descriptors"		
Tool	Object name (noun)	string
Tool Descriptors: same as "Main object descriptors"		
Main support plane	Object name (noun)	String
Plane descriptors	Pose	7 real numbers
Primary support plane	Object name (noun)	string

1 By type "text" we mean an entry filled with "free text" which can be analyzed linguistically, and by type "string" we mean a given name which does not allow linguistic interpretation.

Plane descriptors	Pose	7 real numbers
Secondary support plane	Object name (noun)	string
Plane descriptors	Pose	7 real numbers
Tool support plane	Object name (noun)	string
Plane descriptors	Pose	7 real numbers
Wrist-to-TCP-transform	Pose	7 real numbers
Recording method	Which way robot data was obtained, e.g., "kinesthetic guidance"	string
Recorded data	Trajectories, forces, etc. recorded in the rosbag file	pointer to a file
Anchor Points (SEC)	Semantic Event Chain for this action which defines the chunks of an action	Array of strings
Action primitive sequence 1) name 2) descriptors 3) name 4) descriptors ...	1), 3), etc.: Name(verb) for each action primitive 2), 4), etc.: start and end chunk for each action primitive	1), 3), etc.: text 2), 4), etc.: two integers for each action primitive
SEQUENCE OF ACTION CHUNKS		
SEC chunk 1		
Wrist or TCP characteristics: 1) start time 2) start pose 3) start force 4) end time 5) end pose 6) end force	Following characteristics are shown: 1) Start time of the action chunk as in rosbag 2) Pose of the robot wrist/TCP at start time 3) Force of the robot manipulator at start time 4) End time of the action chunk as in rosbag 5) Pose of the robot wrist/TCP at end time 6) Force on the robot manipulator at end time	1) 1 real number 2) 7 real numbers 3) 6 real numbers 4) 1 real number 5) 7 real numbers 6) 6 real numbers
Main object characteristics: 1) start time 2) start pose 3) end time 4) end pose	Following characteristics are shown: 1) Start time of the action chunk as in rosbag 2) Pose of the robot wrist/TCP at start time 3) End time of the action chunk as in rosbag 4) Pose of the robot wrist/TCP at end time	1) 1 real number 2) 7 real numbers 3) 1 real number 4) 7 real numbers
Primary object characteristics: 1) start time 2) start pose 3) end time 4) end pose	Following characteristics are shown: 1) Start time of the action chunk as in rosbag 2) Pose of the robot wrist/TCP at start time 3) End time of the action chunk as in rosbag 4) Pose of the robot wrist/TCP at end time	1) 1 real number 2) 7 real numbers 3) 1 real number 4) 7 real numbers
Secondary object characteristics: 1) start time 2) start pose 3) end time 4) end pose	Following characteristics are shown: 1) Start time of the action chunk as in rosbag 2) Pose of the robot wrist/TCP at start time 3) End time of the action chunk as in rosbag 4) Pose of the robot wrist/TCP at end time	1) 1 real number 2) 7 real numbers 3) 1 real number 4) 7 real numbers
Tool characteristics: 1) start time 2) start pose 3) end time 4) end pose	Following characteristics are shown: 1) Start time of the action chunk as in rosbag 2) Pose of the robot wrist/TCP at start time 3) End time of the action chunk as in rosbag 4) Pose of the robot wrist/TCP at end time	1) 1 real number 2) 7 real numbers 3) 1 real number 4) 7 real numbers
Grasp characteristics: 1) grasp status 2) grasp type 3) grasp pose 4) grasp force 5) success	1) Indicates if in the action chunk robot needs to grasp, to ungrasp or make no change to the grasp status; 2) grasp type from a grasp type table 3) wrist/TCP pose 4) normalized force for gripper closing 5) success of a grasp	1) string 2) string 3) 7 real numbers 4) number from interval [0, 1] 5) true or false
Movement primitives, for each primitive: 1) movement primitive name	1) Indicates the sequence of movement primitives in the chunks, eg. 1."hand preshape", 2."move arm", 3."grasp". 2) Start time of each movement primitive.	1) string 2) 1 real number 3) 1 real number 4) numerical values,

2) start time for the movement primitive 3) end time for the movement primitive 4) parameters for the movement primitive	3) End time of each movement primitive. 4) Different primitives have different parameters, e.g. for "move arm" primitive parameters are start and end pose of the TCP, while for "grasp" parameter is the grasp force, etc.	depending on the primitive type
Action chunk success specifier: 1) SEC transition 2) trajectory 3) force 4) pose 5) failure description	Overall success to reach the desired end state 1) was the desired SEC transition achieved? 2) did the trajectories match to planned ones? 3) did the forces match the planned ones? 4) were the required end poses achieved? 5) textual description of failure	1) true or false 2) real number (1:full success) 3) real number (1: full success) 4) real number (1: full success) 5) text
SEC chunk 2		
Same as for SEC chunk1		
More chunks if needed		
Overall action success specifier: 1) precondition success 2) overall success 3) failure anchor	1) Were preconditions fulfilled by a scene? 2) Was the action overall succesful 3) If not, which chunk has failed	1) true or false 2) true or false 3) integer number