JOB DESCRIPTION (example) Sent from planner in the server to robot

```
[ job_id:"1"
job_type:"BRING_CHARGER"
robot_name:"ChargePal1"
cart_name:"BAT_1"
source_station:"BCS_1"
target_station:"ADS_1" ]
```

JOB AND ACTION SEQUENCE

PRE CONDITIONS	**ROBOT AT ADS** - cart on robot - battery connected to ADS (arm free) (1)	**ROBOT AT BCS** - cart on robot - battery connected to BCS (arm free) (2)	**ROBOT AT BWS** - cart on robot - battery stowed on cart (3)		**ROBOT AT RBS** - no cart on robot (4)		
JOB TYPES	ROBOT AT ADS or BCS or BWS				ROBOT AT RBS		POST CONDITIONS
	same battery		different battery		different battery		
	battery at ADS or BCS	battery at BWS	battery at ADS or BCS	battery at BWS	battery at ADS or BCS	battery at BWS	
BRING CHARGER	1. plugout_ADS/BCS 2. arrive_at_station 3. plugin_ADS (A1)	1. arrive_at_station 2. plugin_ADS (A2)	1. drop_cart 2. arrive_at_station 3. pickup_cart 4. plugout_ADS/BCS 5. arrive_at_station 6. plugin_ADS (B1)	1. drop_cart 2. arrive_at_station 3. pickup_cart 4. arrive_at_station 5. plugin_ADS (C1)	1. arrive_at_station 2. pickup_cart 3. plugout_ADS/BCS 4. arrive_at_station 5. plugin_ADS (B2)	1. arrive_at_station 2. pickup_cart 3. arrive_at_station 4. plugin_ADS (C2)	- robot at ADS - cart on robot - battery connected to ADS (arm free) (1)
	battery at ADS	battery at BWS	battery at ADS	battery at BWS	battery at ADS	battery at BWS	
RECHARGE CHARGER	1. plugout_ADS 2. arrive_at_station 3. plugin_BCS (D1)	1. arrive_at_station 2. plugin_BCS (D2)	1. drop_cart 2. arrive_at_station 3. pickup_cart 4. plugout_ADS 5. arrive_at_station 6. plugin_BCS (E1)	1. drop_cart 2. arrive_at_station 3. pickup_cart 4. arrive_at_station 5. plugin_BCS (F1)	1. arrive_at_station 2. pickup_cart 3. plugout_ADS 4. arrive_at_station 5. plugin_BCS (E2)	1. arrive_at_station 2. pickup_cart 3. arrive_at_station 4. plugin_BCS (F2)	- robot at BCS - cart on robot - battery connected to BCS (arm free) (2)
	same battery		different battery		different battery		
STOW CHARGER	1. plugout_ADS/BCS 2. arrive_at_station (A3)		1. drop_cart 2. arrive_at_station 3. pickup_cart 4. plugout_ADS/BCS 5. arrive_at_station (B3)		1. arrive_at_station 2. pickup_cart 3. plugout_ADS/BCS 4. arrive_at_station (B4)		- robot at BWS - cart on robot - battery stowed on cart (3)
RECHARGE SELF	ROBOT AT ADS or BCS or BWS 1. drop_cart 2. go_home (G0)				invalid job		- robot at RBS - no cart on robot

KEY	
ADS : Adapter Station,	Station where robot charges the vehicle
BCS: Battery Charging Station	Station where the battery cart gets charged
BWS: Battery Waiting Station	Station where battery cart is stored
RBS: Robot Base Station	Station where robot gets charged
Station = {stationName}_{stationNumber}_pick	The station name can be ADS,BWS,BCS i.e, where there is a possibility for carts to be picked. Here, **pick** refers to the location in the map from where pickup_cart action is triggered.
Station = {stationName}_{stationNumber}	The station name is followed by "_" and station number
Robot= ChargePal{robotNumber}	ChargePal is followed by robot number without any space
Cart= {cartName}_{cartNumber}	The cart name is followed by "_" and cart number

JOB RECOVERY BEHAVIOURS

Robot location	pickup_cart	drop_cart	arrive_at_station		plugin	plugout
			with cart	without cart		
BWS	1.check assert lift is down 2.go_home	call for help	1.Try different BWS station (ask for station to the server) 2.call for help	go home	---	---
BCS	1.check assert lift is down 2.go_home	1.go to BWS 2.place cart 3.go home	1.Try different BCS station (ask for station to the server) 2. if none, ask server for BWS, go to BWS 2.1. place cart 2.2. go home	go home	1.check arm is free 2. ask server for BWS, go to BWS 3.place cart 4.go home	1.check arm is free 2.drop cart 3.go home
ADS	1.check assert lift is down 2.go_home	1.Wait until charging service is done (Try place cart every ~10 mins) 2.if robot battery < 20% - call for help	1.ask server for BWS, go to BWS 2.place cart 3.go home	go home	1.check arm is free 2.ask server for BWS, go to BWS 3.place cart 4.go home	1.check arm is free 2.drop cart 3.go home
RBS	go_home					

ENVIOINMENT REPRESENTATION

robot_name	robot_location	current_job	ongoing_action	previous_action	cart_on_robot	error_count	battery_percentage

cart_name	cart_location	robot_on_cart	plugged	error_count	battery_percentage

MESSAGE TYPES

robot_location/ cart_location (str)	current_job (str)	ongoing_action / previous_action (str)	cart_on_robot (str)	plugged (str)	error_count	battery_percentage	Notes
{station}	BRING CHARGER RECHARGE CHARGER STOW CHARGER RECHARGE SELF	none arrive_at_station_{station} arrive_at_station_{station}_failure go_home go_home_failure place_charger place_charger_failure pickup_charger pickup_charger_failure plugin_charger_ads plugin_charger_ads_failure plugin_charger_bcs plugin_charger_bcs_failure plugout_charger_ads plugout_charger_ads_failure plugout_charger_bcs plugout_charger_bcs_failure recovery_arrive_{station}	none {robot} {cart}	"true" "false"	int	float	When an action is **started** ,ongoing_action is set to "**{actionName}**". When an action is **finished** ongoing action is set to "**none**" and previous action is set to "**{actionName}**". When an **action fails**, ongoing_action is set to "**none**" and previous action is updated with "**{actionName}_failure**". error_count is incremented everytime robot goes into a recovery process