Procedure: NA06 Robot Push-up Routine

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# Introduction

The purpose of this procedure is to outline the necessary steps and requirements for NA06 “Bob” robot to perform a set of three pushups. “Bob” is a small humanoid robot which utilizes Natural Language Processing (NLP) and speech synthesis to emulate human interactions. Bob can answer questions, initiate question and answer routines, and perform locomotive movements.

# Precautions

The following items must be strictly adhered to for complete and safe operation of the robot during this procedure.

1. Warning - There must be a clear space of at least 2 feet by 2 feet.
2. Caution - The ground material must be clean and dry.
3. Caution - The ground material must be smooth and uniform.

# Prerequisites

The following steps must be completed before the robot is in the correct state to perform the push-up routine.

1. Robot must be in resting squat position.
2. Robot must be ready for voice commands.

# Procedure

The following steps must be taken for the robot to perform a push-up routine consisting of three (3) individual push-ups.

## Push-up position

1. Extend arms forward and rotate fists so that palms are facing upwards.
2. Spread knees to pivot the body forward and rotate feet outwards.
3. Pitch body forward until fists contact ground surface.
4. Extend legs backwards until fully extended.
5. Rotate both feet inwards until feet are aligned in the vertical position.
6. Straighten both knees until both legs and knees align horizontally.

## Downwards movement

1. Rotate both elbows into outward position to prepare for downwards motion.
2. Bend both elbows outwards to induce downwards motion.
3. Allow body to move downwards until contact with the ground surface.

## Upwards movement

1. Straighten both elbows to induce upwards motion.
2. Allow body to move upwards until arms are fully extended.

## Completed single push-up

1. Announce the currently completed pushup number.

## Repeat push-up routine three (2) times

1. Repeat Steps 8-13 twice for a total of three (3) times.

# Post-performance activities

The following steps must be completed immediately prior to completing the push-up routine.

1. Return to standing position.
2. Announce completion of routine.

# Glossary

Please refer to the following definitions throughout this procedure document.

**Command:** A word or phrase that is spoken aloud by a human directed to the robot.

**Prompt:** A question that is spoken aloud by the robot soliciting a follow up response from a human.

**Answer:** A word or phrase spoken aloud by a human indicating the response to a prompt.

**Speech:** A word or phrase spoken aloud by the robot.

**Movement:** A physical action performed by the robot.

# Procedural Flowchart

The following flowchart provides a high level overview of the push-up routine.

