ACES ROBOTICS AND AUTOMATION

SAFETY

The robots are industrial robots with corresponding power and operating speeds, and every care must be taken to ensure the safety of everyone within their vacinity.

1. The robot must not be operated unless the lecturer or technician is present.
2. You must not attempt to operate the robot unless you have received instruction in programing by either a lecturer or technician.
3. Emergency stop. Press the red stop button on the teach pendant.

TASK 1 REARRANGE THE FOLLOWING V+ COMMANDS INTO A WORKING PROGRAM

The robot will be taught two positions. These will be named PEG and PLACE. A program is required to pick up a component from location PEG and move it to location PLACE, all at 50% speed. Please see Fig.1. Below is a mixed - up programe that needs re - arranging use the lines provided to write the re - arranged programe.

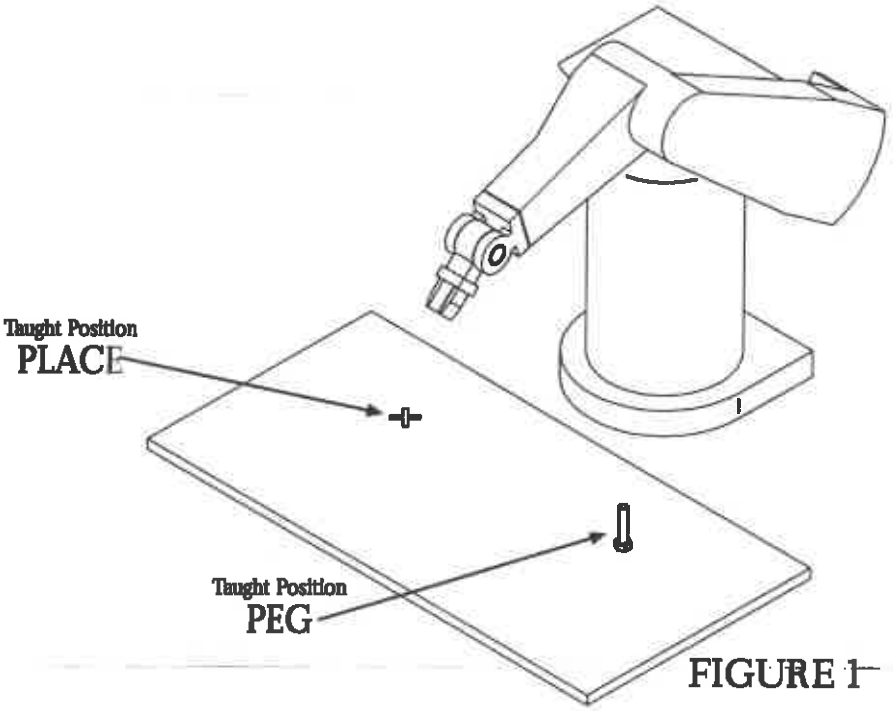

FIGURE 1

OPENI
CLOSEI
DEPART 50
SPEED 50 ALWAYS
DELAY 2
MOVE PLACE
APPRO PLACE, 50
MOVES PEG
DEPART 50
APPRO PEG, 50
OPENI

TASK 2 REARRANGE THE FOLLOWING V+ COMMANDS INTO A WORKING PROGRAM

The robot will be taught three taught positions they are SAFE, PEG and PLACE. The component at taught position PEG is being delivered using a feeder system, and will always be at the same location. A program is required to move a component from PEG to PLACE and return via SAFE repeating the operation three times. The program will be at 75% speed. Please see Fig. 2. The robot gripper or end - affector is not a consideration in this task. Below is a mixed up program which needs re - arranging..

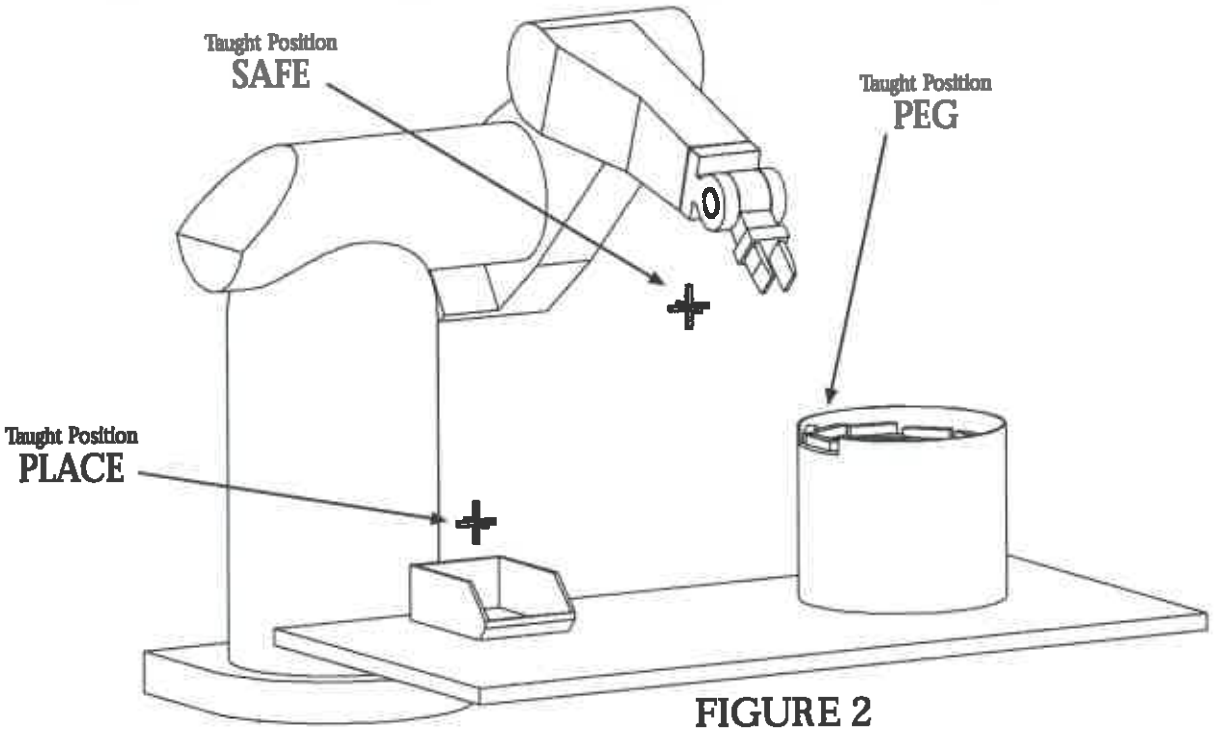

FIGURE 2

COUNT = COUNT+1 _____
OPENI _____
CLOSEI _____
IF COUNT < 3 GOTO 10 _____
MOVES PEG _____
DEPARTS 50 _____
APPRO PEG, 20 _____
SPEED 75 ALWAYS _____
DELAY 0.50 _____
10 MOVE SAFE _____
MOVES PLACE _____
COUNT = 0 _____
MOVE SAFE _____
OPENI _____
DEPARTS 20 _____
APPRO PLACE, 50 _____

TASK 3 PICK AND PLACE USING SHIFT

a) Below is an example of the SET command as written in a program:

SET COMPONENT = PICKPOS
New name = old name.

b) Below is an example of the SHIFT command as written in a program:

SET COMPONENT = SHIFT(COMPONENT BY 0,50,0)
Location moved by 50mm to establish new location.

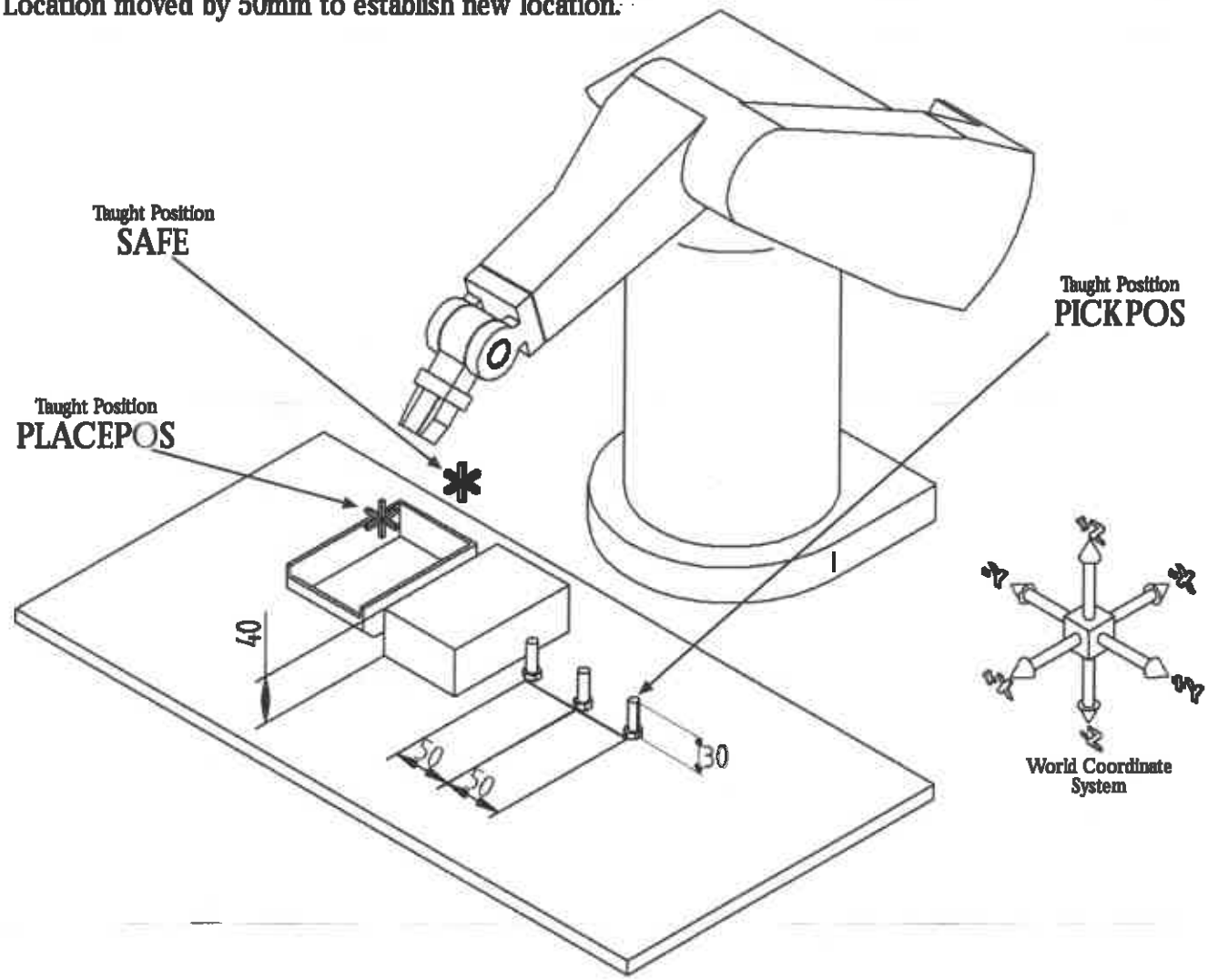

FIGURE 3

c) Write a program to move the three components that are spaced 50mm apart over the obstacle and into the box. The robot has been taught three positions. They are SAFE, PICKPOS and PLACEPOS. The program you write should make use of Task 1 and Task 2 commands. In addition, two new commands stated above in Task 3 parts a) and b) commands SET and SHIFT. The moves the robot makes should be between the components and PLACEPOS, and be via SAFE enroute which avoids the obstacle. Please see Fig.3. All the components should be placed at taught position PLACEPOS.

TASK 4 TOWER BUILD STAUBLI RX90 PROGRAM USING COUNTER

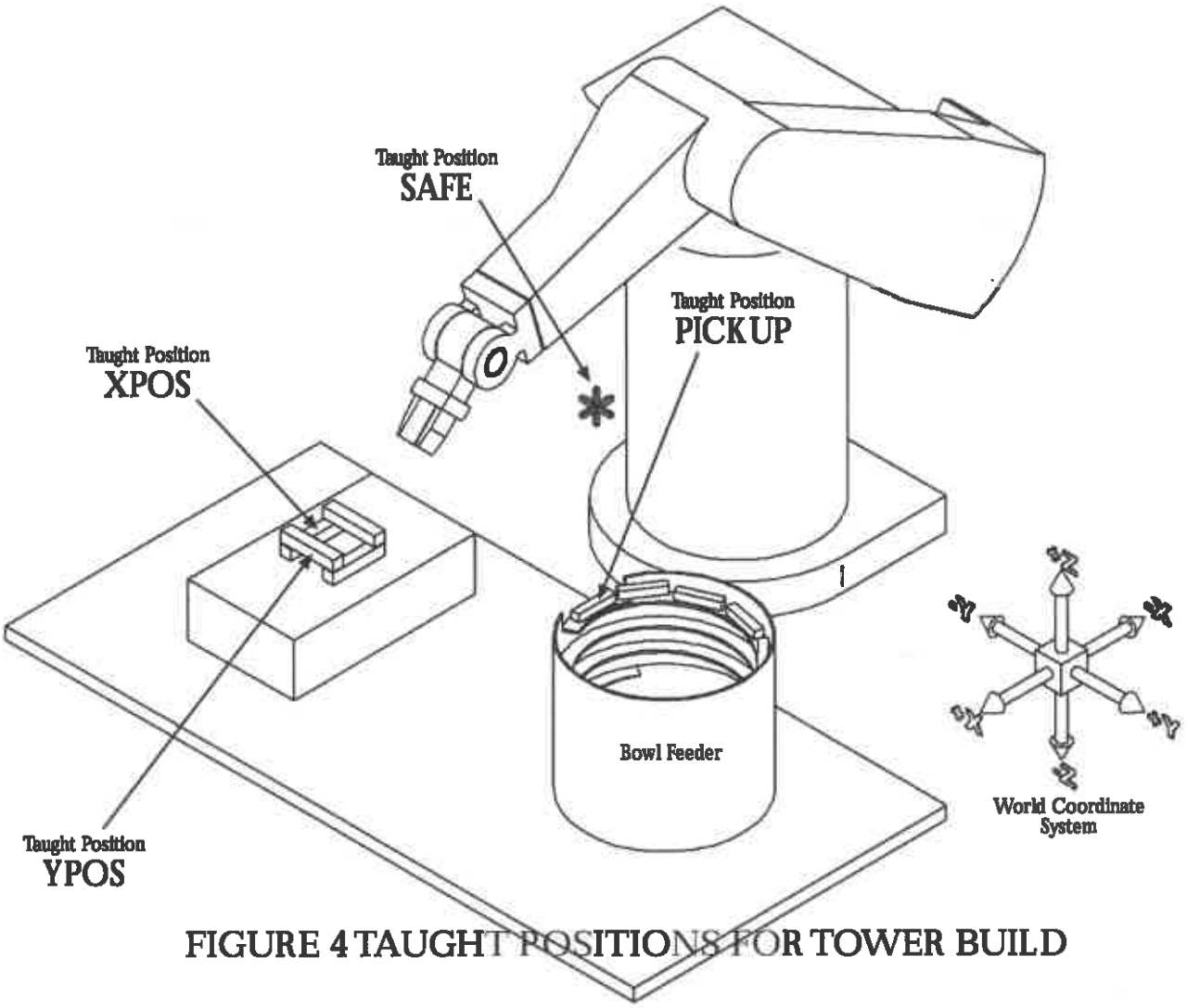

FIGURE 4 TAUGHT POSITIONS FOR TOWER BUILD

Please see the Figure 4 above. The robot has been taught four positions SAFE, PICKUP, XPOS and YPOS. You are to write a V+ program to build a tower from rectangular sticks where only two initial stick positions are known ie, XPOS and YPOS. The sticks are 9.7mm square and 50mm long, made from aluminium. Your program will need sticks from taught position PICKUP and your route should go to and from the Bowl Feeder through taught position SAFE.

FIGURE 5 A TOWER MADE FROM STICKS FIVE LAYERS HIGH