

V5. Computer Programming

1. Task

- (a) Create a program designed to put a PA-10, which is an industrial robot equipped with an arm that has a similar structure to a human arm (manufactured by Mitsubishi Heavy Industries), into operation to draw a figure using closed curves combining circular arcs and straight lines.
- (b) When drawing a stipulated figure to be presented on the day of the contest, contestants can use their own program created in advance for practice. They are requested to bring their own program in CD-ROM. Note that no particular consideration will be made when any malfunction occurs concerning their CD-ROM.

2. Allocated time

6 hours

3. How to present the completed work

Contestants shall present the figure drawn using a PA-10 and the created program in the form of printed documents.

4. Instructions

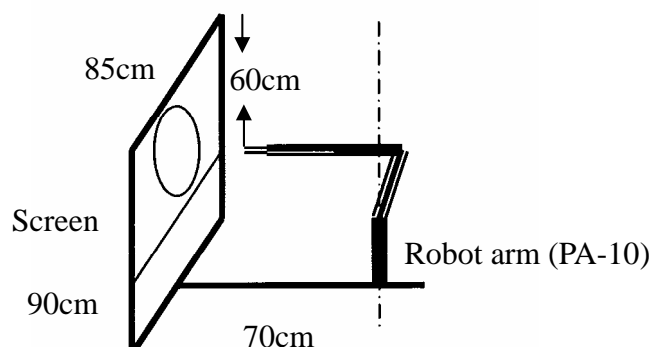
- Contestants shall create a program using the PA-10's function for basic operations based on Visual Basic or Visual C, but the "teaching function" shall not be used.
- During the contest, a relevant robot will be assigned to each contestant.
- The robotics device consists of a 7-axis manipulator PA-10 (manufactured by Mitsubishi Heavy Industries), computer (for creating and executing a drawing program), ink-jet color printer (for printing a source list), and a screen for drawing.

<Note>

For details of the PA-10, see the website at:

<http://www.sanki-mhi.co.jp/RJengHPE/products/pa10.html>

- The screen is a plane surface 85cm wide and 90cm high, which will be installed at a position about 70cm from the front of the robot (PA-10), standing vertically facing it, where a white sheet of paper 80cm wide and 60cm long will be affixed, on which a figure is drawn using a felt-pen mounted at the tip of the robot arm.



- Contestants shall notify the judge when they finish the task.

5. Equipment, etc., to be prepared on site

Equipment	Specification
Robot body	General-purpose robot PA-10 manufactured by Mitsubishi Heavy Industries, Ltd.
Base	100mm x 100mm H-shaped steel, hanging rack structure, with a vertical drawing wall attached
Drawing equipment	White board marker and holding mechanism
PC for program creation	OS: Windows XP-professional One PC for each contestant
Application	Visual Studio (Visual Basic, Visual C) produced by Microsoft
Printer	
Drawing paper	

<Note>

Contestants who need any assistive technology (hardware and software) requiring installation in the computer are requested to notify the secretariat for approval in advance. In principle, such assistive technology shall be brought by the relevant contestant and installed in the computer in the presence of judges during the orientation session held in advance of the contest. Note that no particular consideration will be made when any malfunction occurs concerning the installation.

6. Evaluation criteria

Items to be evaluated	Maximum marks allotted
Accuracy and aesthetic quality of drawn figure	50
Drawing time	20
Scale of program	20
Drawing method	10
Total	100