

Reference

Sense Plan Act (SPA)

Sense, Plan, Act was an early robot control procedure commonly abbreviated **SPA**. Today we use its fundamental concepts to remind us of the **three critical capabilities** that every robot must have in order to operate effectively:

SENSE: The robot needs the ability to **sense important things about its environment**, like the presence of obstacles or navigation aids. What information does your robot need about its surroundings, and how will it gather that information?

PLAN: The robot needs to take the sensed data and figure out how to **respond appropriately** to it, based on a **pre-existing strategy**. Do you have a strategy? Does your program determine the appropriate response, based on that strategy and the sensed data?

ACT: Finally, the robot must actually act to **carry out the actions** that the plan calls for. Have you built your robot so that it can do what it needs to, physically? Does it actually do it when told?

Where are *S*, *P*, and *A* in this program?

```
task main()
{
    robotType(recbot);

    while(true)
    {
        forward(63);
        untilTouch();
        stop();

        pointTurn(left, 63);
        wait(1);
        stop();
    }
}
```

SENSE: The robot uses a **Bumper Switch** to sense whether it has collided with an object.

PLAN: The overall **strategy** for this robot is to run forward unless something is in its way, which it will detect using the **Bumper Switch**. When the Bumper Switch is unpressed, the **motors** will be run **forward**; when the Bumper Switch is pressed, the robot will **turn away** from the obstacle. This is all captured in the **program**, which runs on the robot, reading the sensor's data and issuing the appropriate motor commands.

ACT: The robot acts by **moving its motors** in response to the given motor commands, which are given in combinations that produce forward movement and turns as appropriate.