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()
{
  bMotorReflected[port2]=1;
  while(true)
  {
    if(SensorValue(bumper)==0)
    {
      motor[port3]=127;
      motor[port2]=127;
    }

    else
    {
      motor[port3]=127;
      motor[port2]=-127;
      wait1Msec(1500);
    }
  }
}
```

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**. If the Bumper Switch is unpressed, the **motors** will be run **forward**; if 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.