WPI

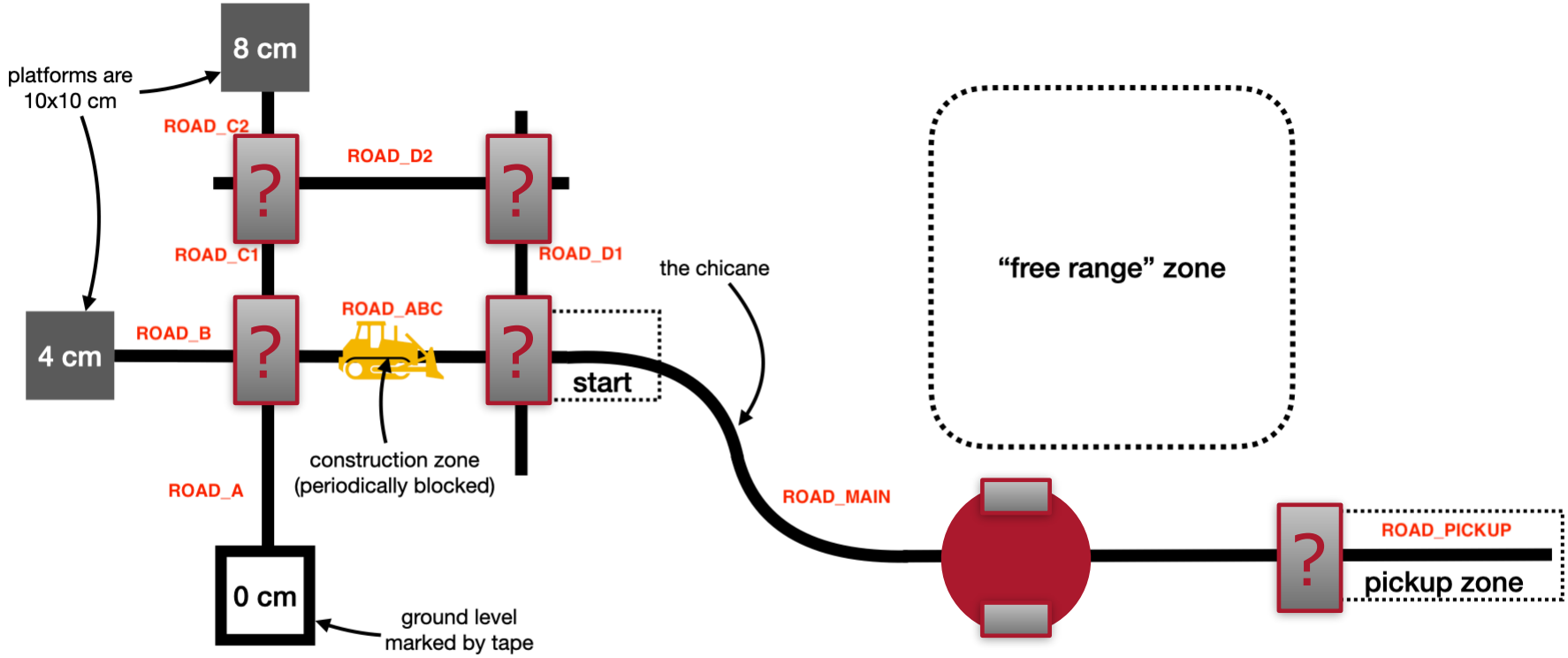
Delivery Robots

FOMRE NSF Workshop

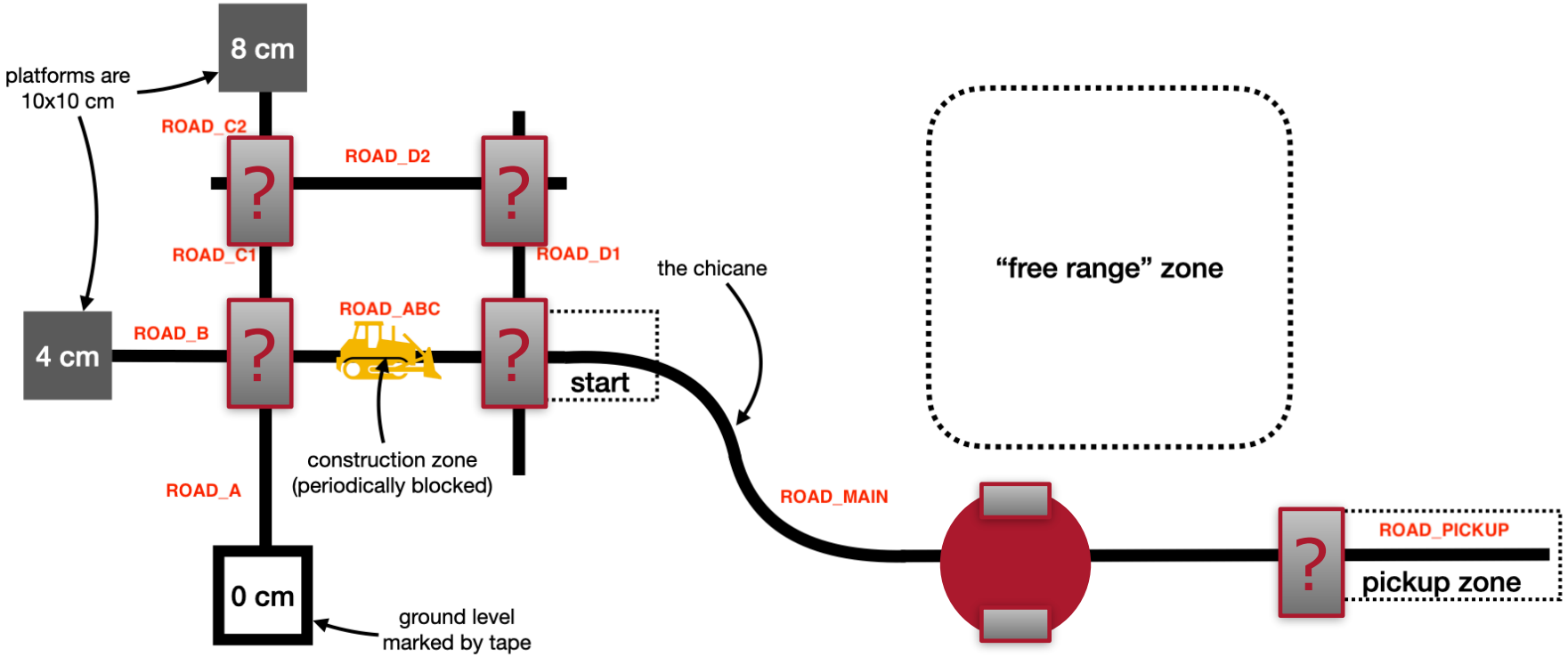
WPI

Navigating the course

Decisions are made at intersections



Decisions are made at intersections



robot tracks:

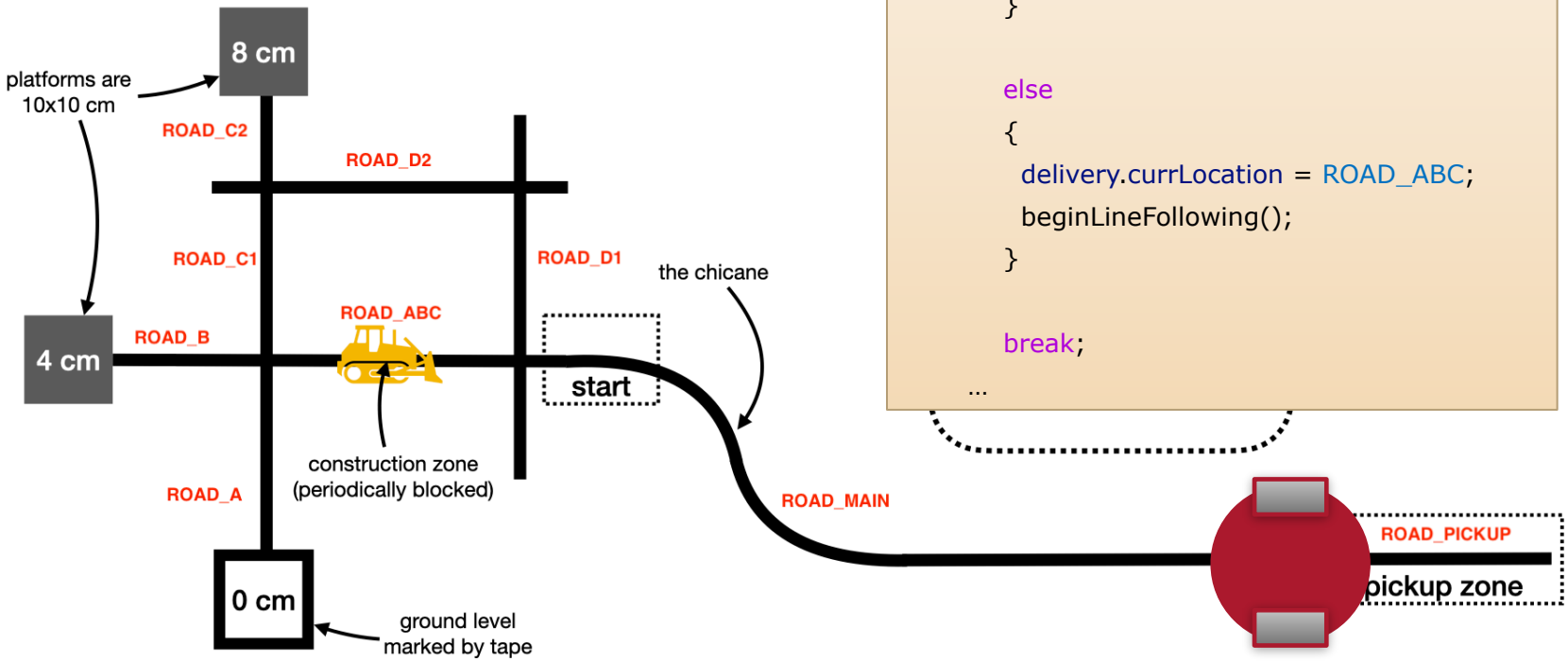
- where it is
- where it is going
- where it needs to deliver

e.g., ROAD_MAIN

```
switch(delivery.currLocation)
{
   case ROAD_MAIN:
      if(delivery.currDest == PICKUP)
      {
         delivery.currLocation = ROAD_PICKUP;
         beginBagging();
      }

      else
      {
        delivery.currLocation = ROAD_ABC;
        beginLineFollowing();
      }

      break;
   ...
```

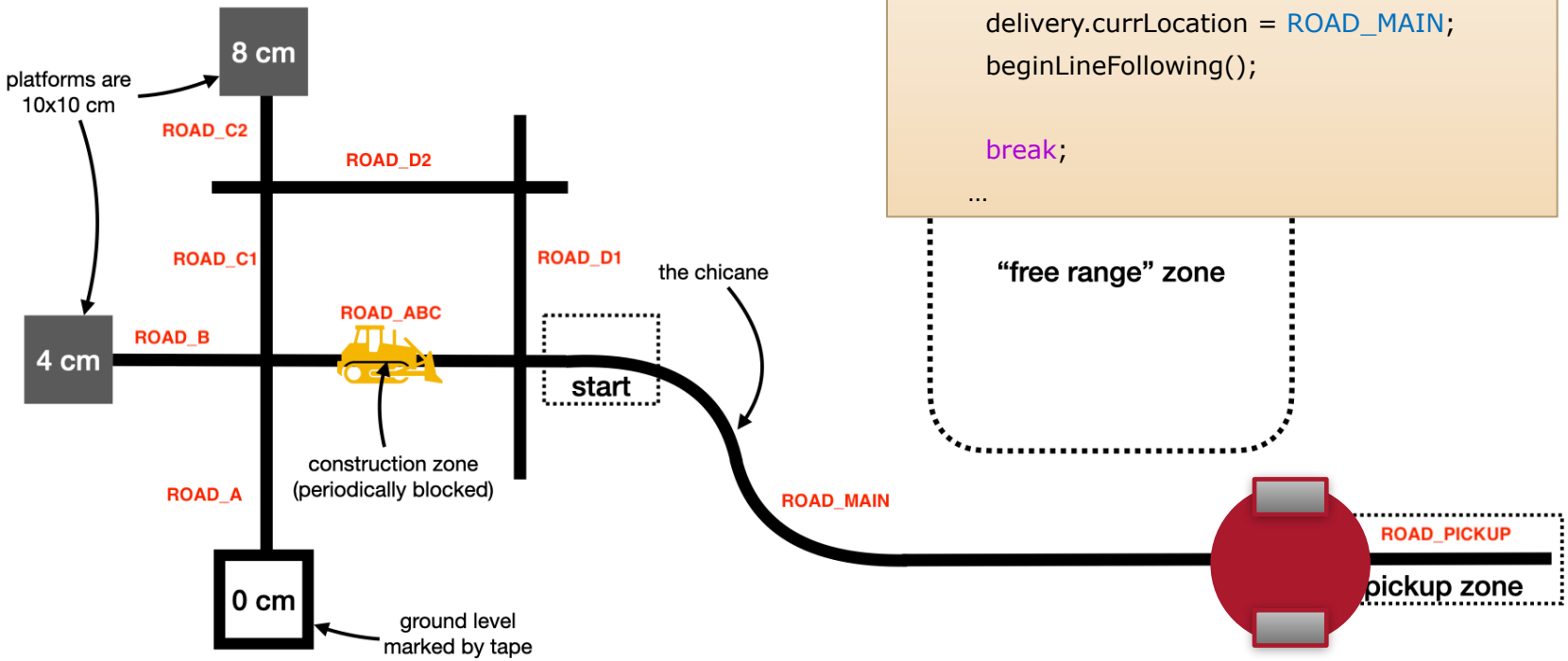


e.g., ROAD_PICKUP

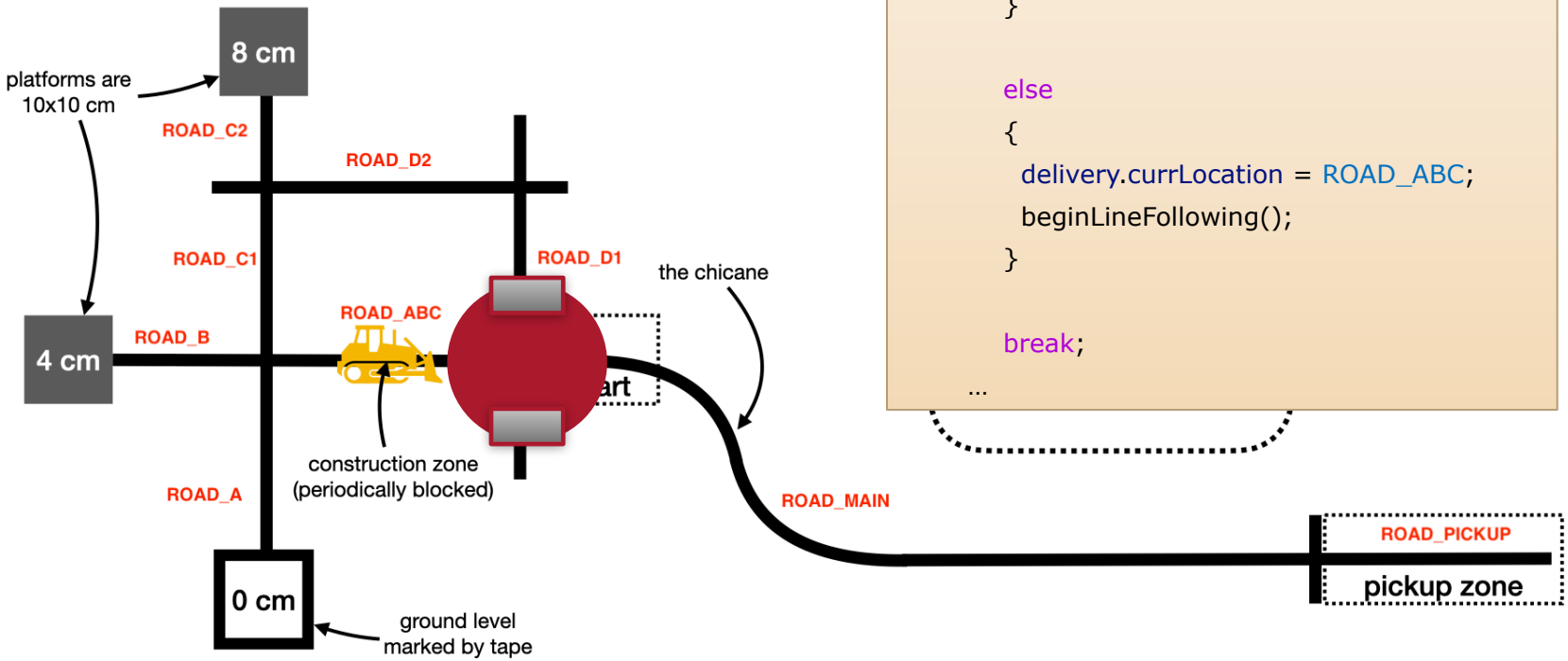
```
switch(delivery.currLocation)
{
   …

   case ROAD_PICKUP:
     delivery.currLocation = ROAD_MAIN;
     beginLineFollowing();

     break;
   …
```



Back to ROAD_MAIN

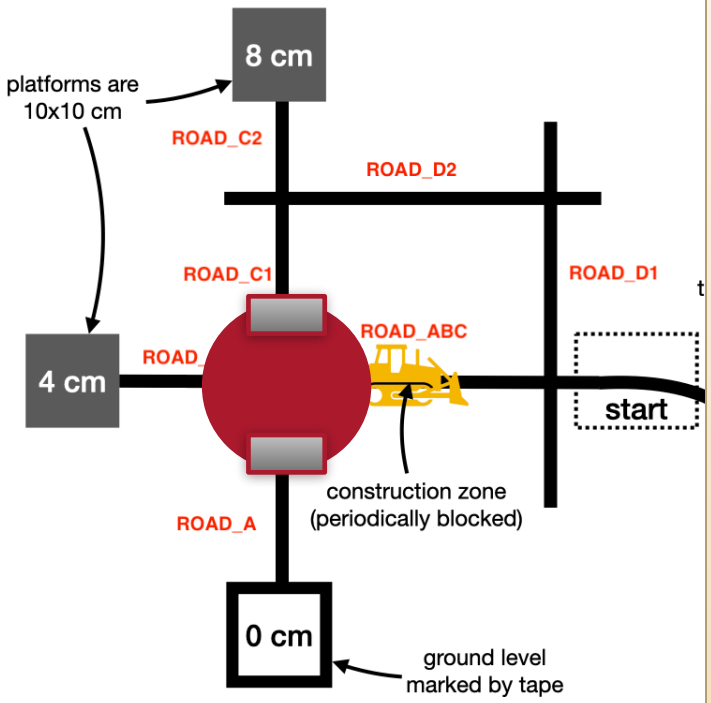



```
switch(delivery.currLocation)
{
   case ROAD_MAIN:
      if(delivery.currDest == PICKUP)
      {
         delivery.currLocation = ROAD_PICKUP;
         beginBagging();
      }

      else
      {
        delivery.currLocation = ROAD_ABC;
        beginLineFollowing();
      }

      break;
   ...
```

ROAD_ABC




```
switch(delivery.currLocation)
{
    case ROAD_ABC:
      if(delivery.currDest == HOUSE_A) {} //LEFT filled in later

      else if(delivery.currDest == HOUSE_B)
      {
         delivery.currLocation = ROAD_B;
         beginDropping();
      }

      else if(delivery.currDest == HOUSE_C) {} //RIGHT filled in later

      else if(delivery.currDest == START)
      {
        delivery.currLocation = ROAD_MAIN;
        idle();
      }

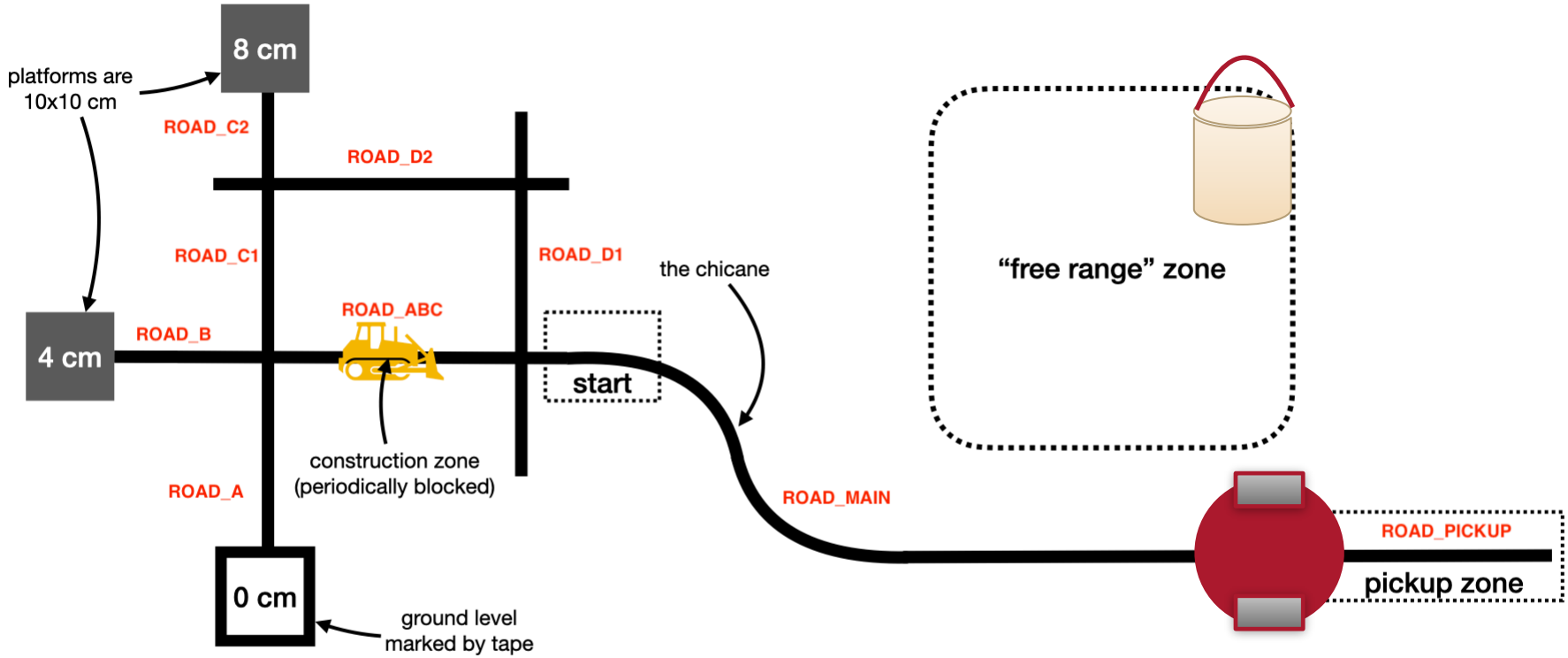
     break;

   ...
```

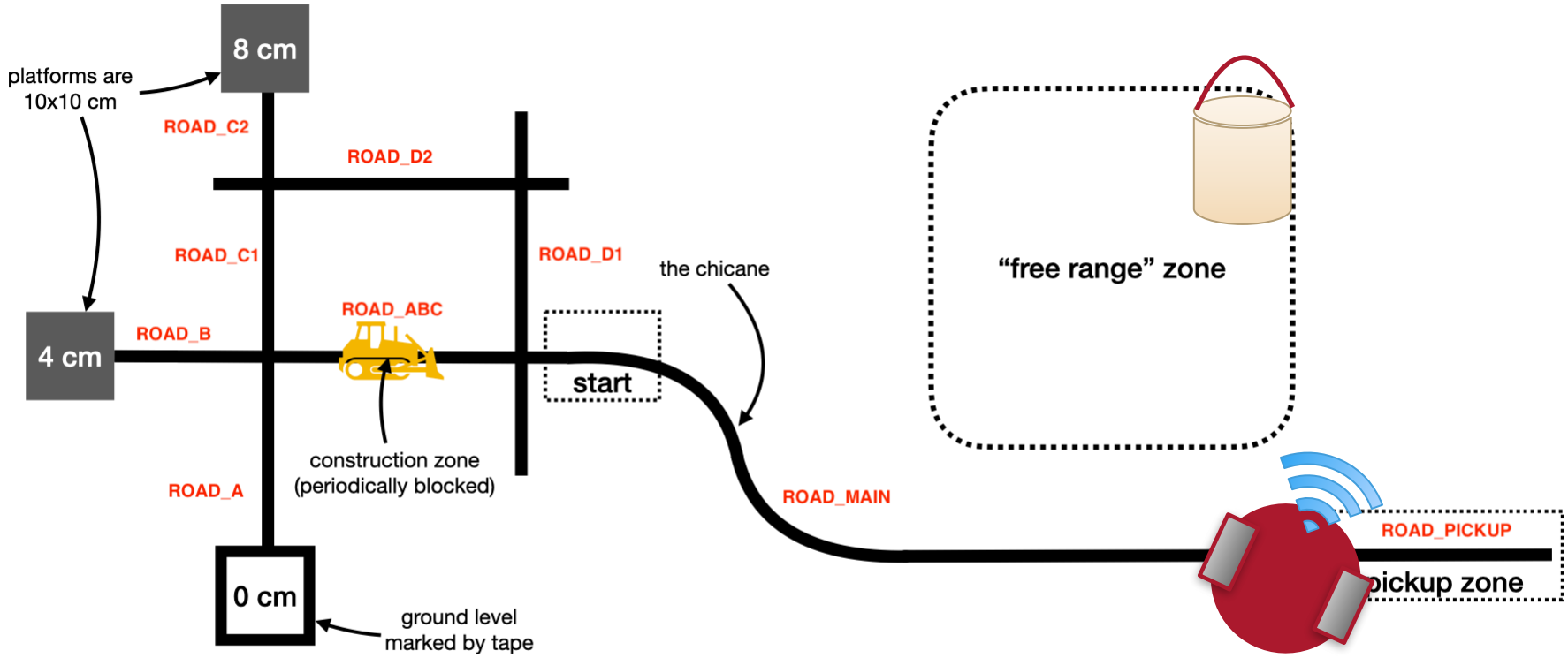
WPI

Free-range bag

The “free-range” bag



The “free-range” bag



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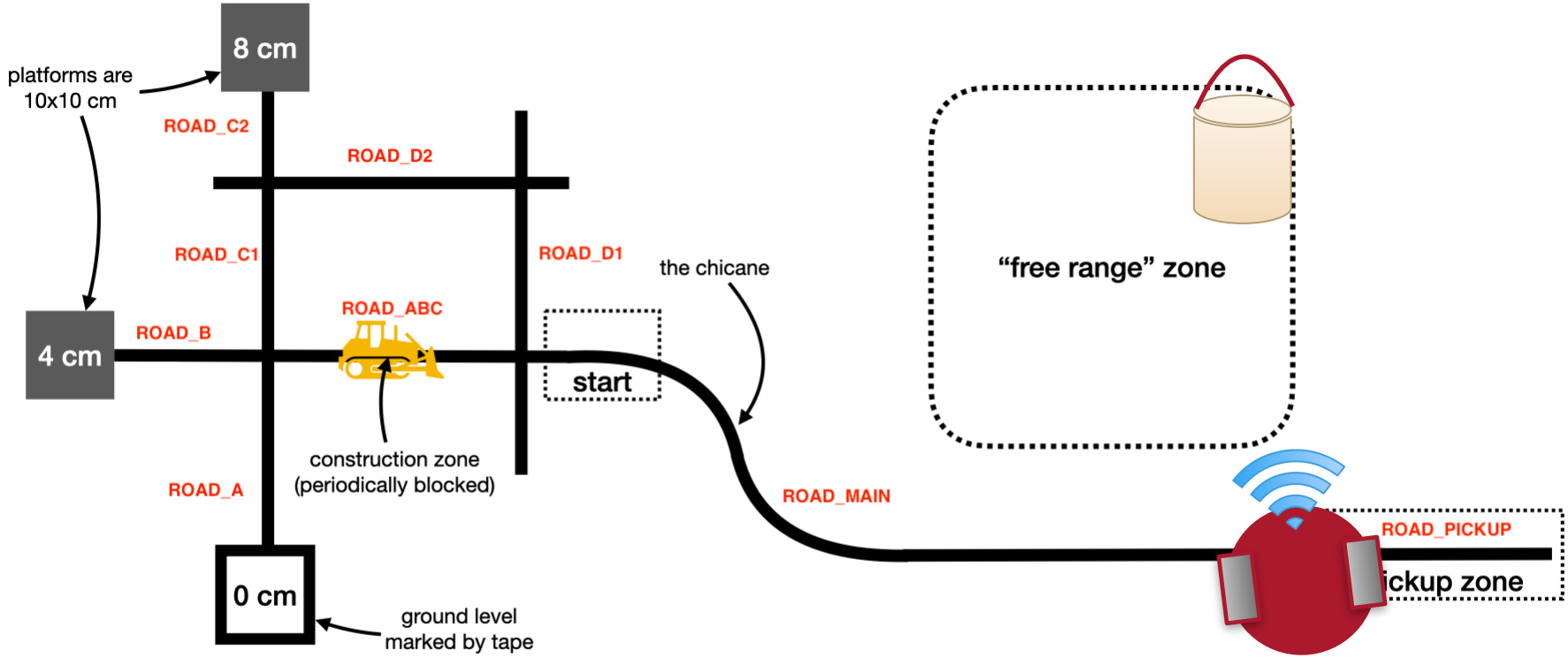
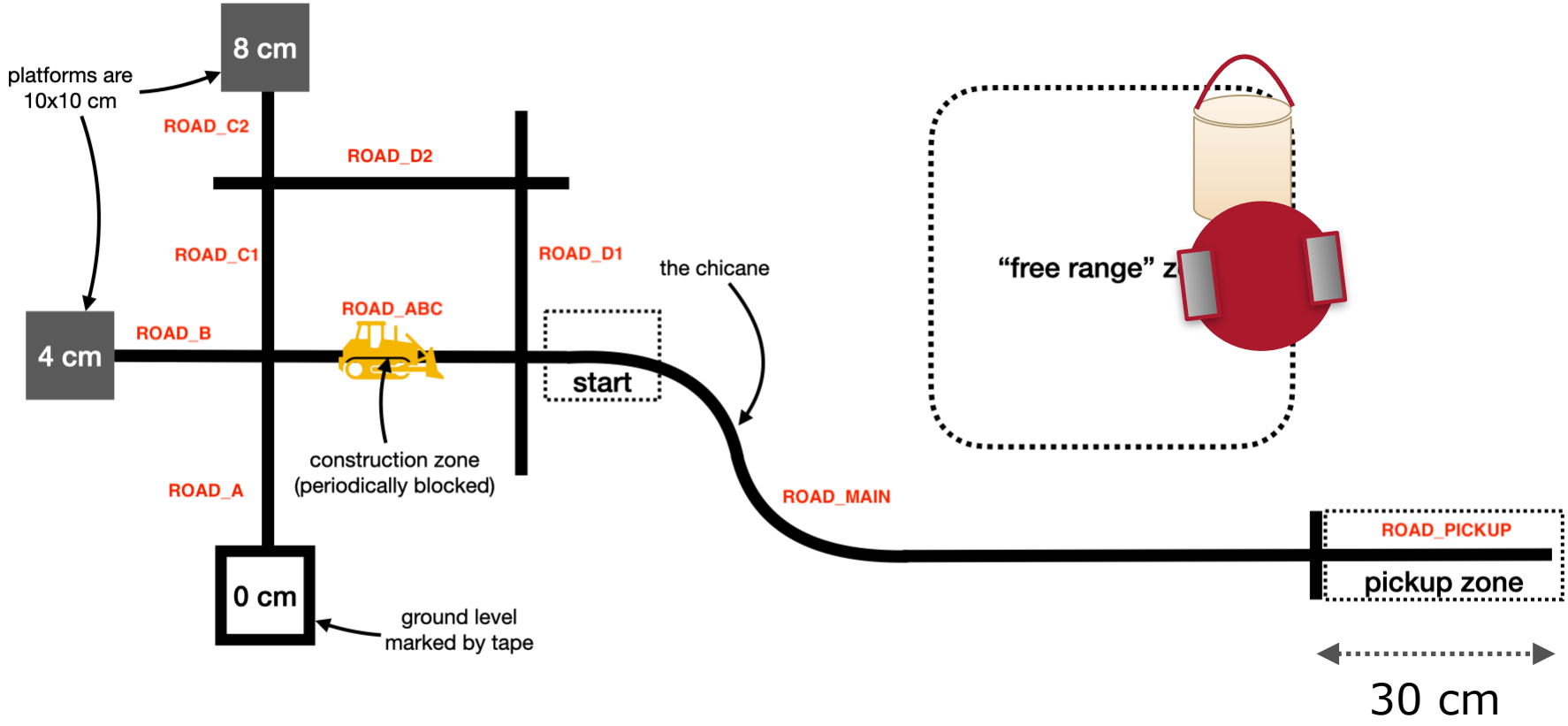
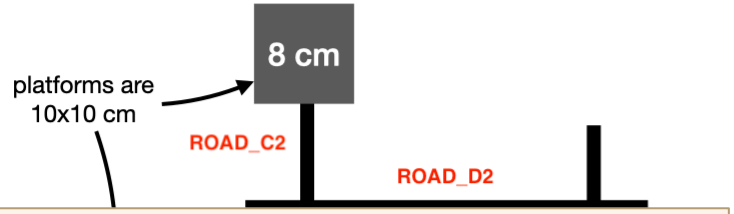


The “free-range” bag

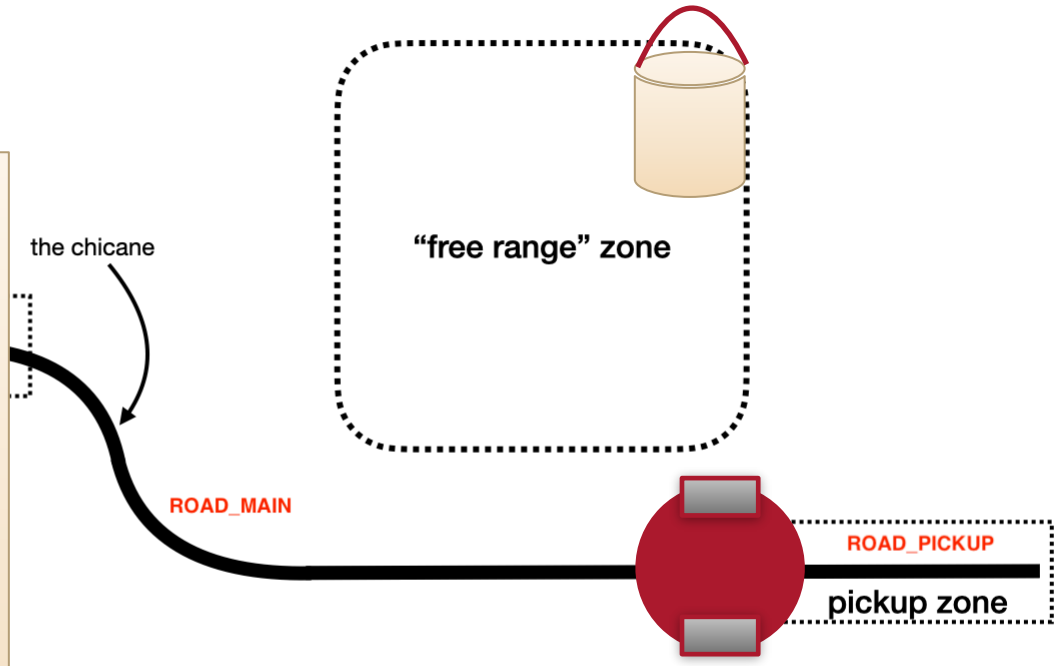


No bag detected in pickup zone



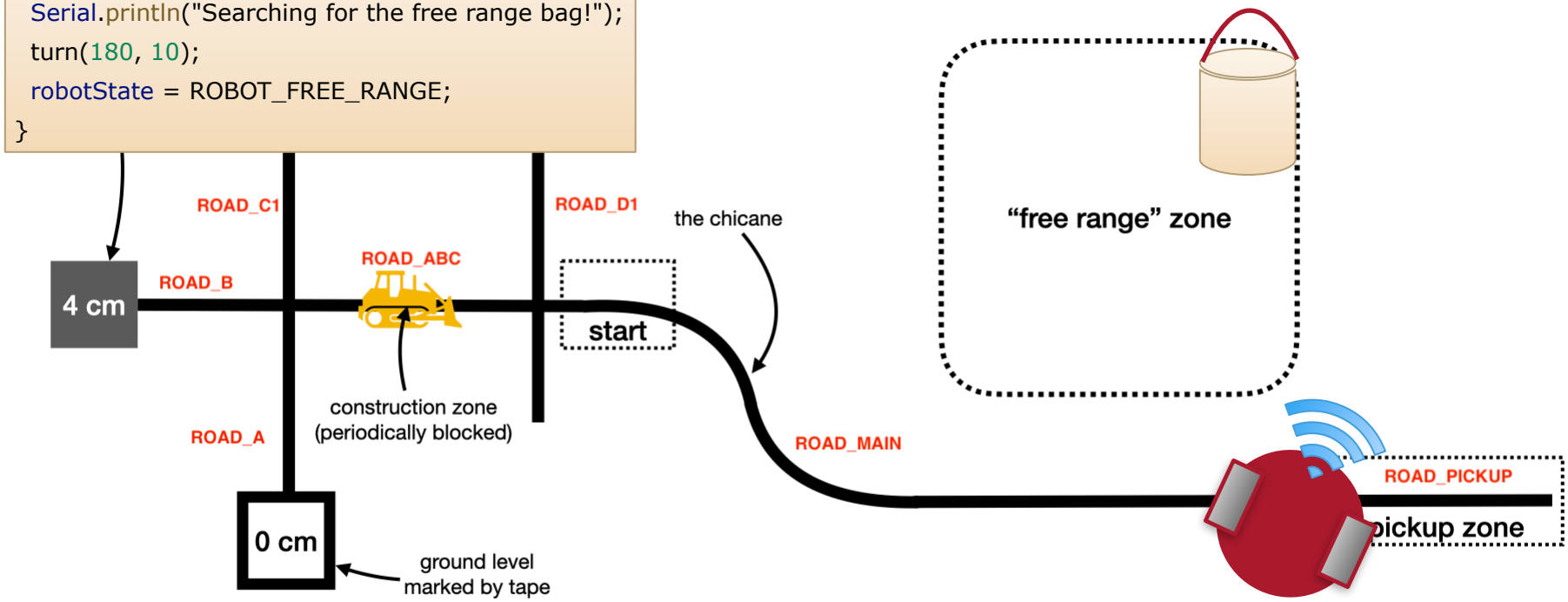

```
switch(delivery.currLocation)
{
   case ROAD_MAIN:
      if(delivery.currDest == PICKUP)
      {
         delivery.currLocation = ROAD_PICKUP;
         float distance = rangefinder.getDistance();
         Serial.println(distance);
         if(distance < 30) beginBagging();

         else
         {
           beginFreeRanging();
         }
      }
```



Turn and search

```
void beginFreeRanging(void)
{
  Serial.println("Searching for the free range bag!");
  turn(180, 10);
  robotState = ROBOT_FREE_RANGE;
}
```

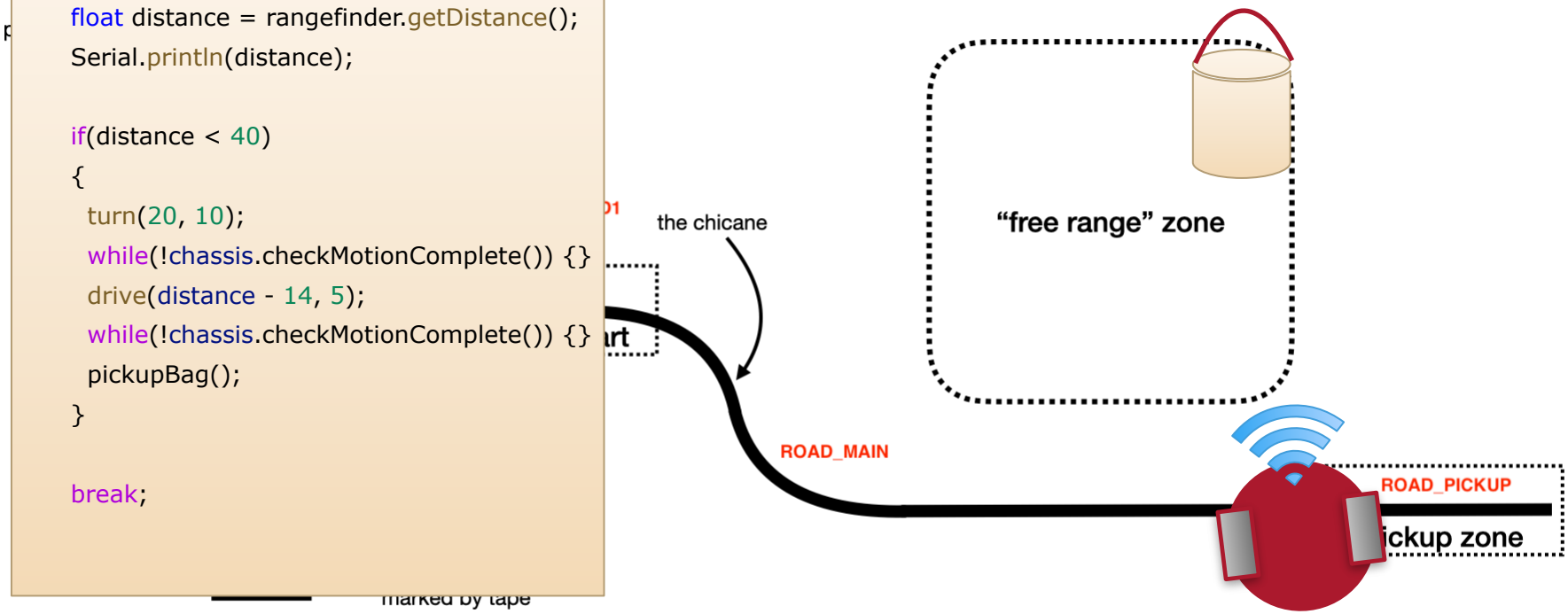


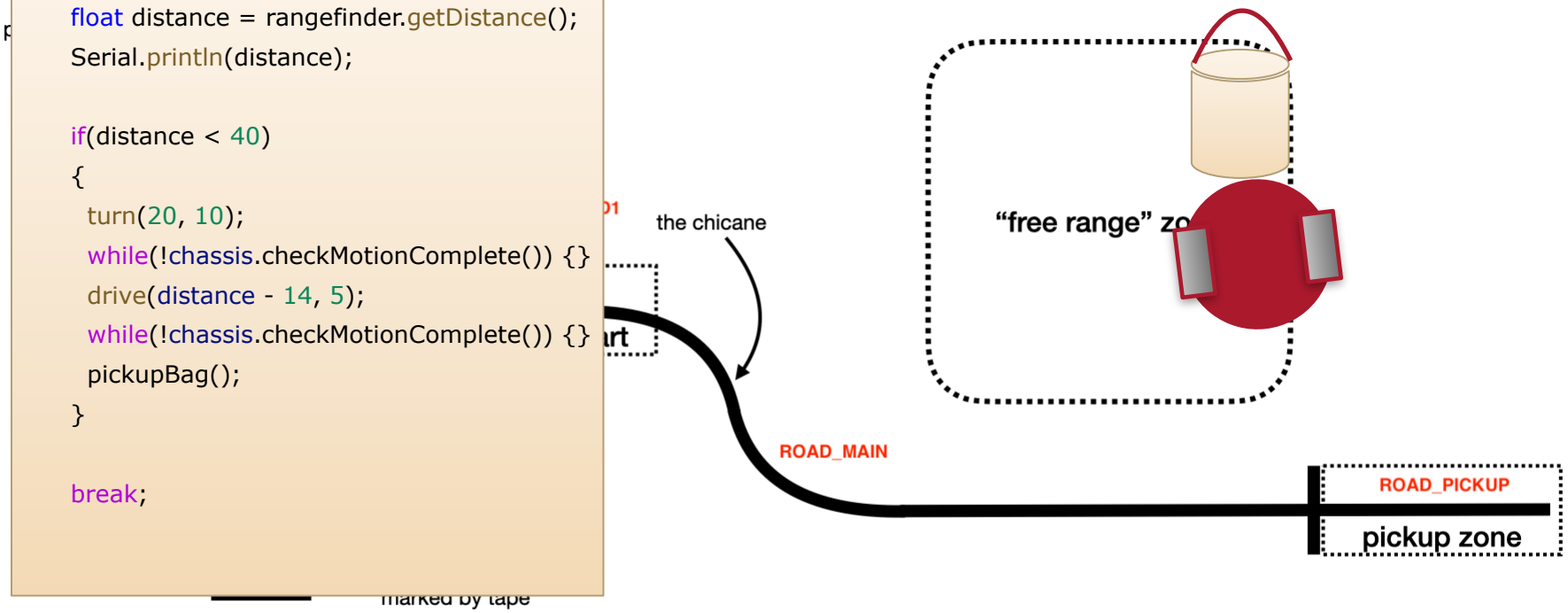
The “free-range” bag

```
case ROBOT_FREE_RANGE:
  float distance = rangefinder.getDistance();
  Serial.println(distance);

  if(distance < 40)
  {
    turn(20, 10);
    while(!chassis.checkMotionComplete()) {}
    drive(distance - 14, 5);
    while(!chassis.checkMotionComplete()) {}
    pickupBag();
  }

  break;
```



The “free-range” bag

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case ROBOT_FREE_RANGE:
  float distance = rangefinder.getDistance();
  Serial.println(distance);

  if(distance < 40)
  {
    turn(20, 10);
    while(!chassis.checkMotionComplete()) {}
    drive(distance - 14, 5);
    while(!chassis.checkMotionComplete()) {}
    pickupBag();
  }

  break;
```