

## Programming with Constants and Variables

Name: \_\_\_\_\_

### Part I –Statement Identification

**Directions:** Briefly describe what each of the following statements does.

1) `repeat(5) { }` \_\_\_\_\_

2) `#define MOVE_TIME 200` \_\_\_\_\_

3) `int turn_time;` \_\_\_\_\_

4) `Wait(Random (300));` \_\_\_\_\_

5) `Wait (MOVE_TIME);` \_\_\_\_\_

6) `MOVE_TIME += 5;` \_\_\_\_\_

7) `SetPower(OUT_A + OUT_C, power);` \_\_\_\_\_

### Part II – Explaining Programs

**Directions:** For each of the given programs, answer the questions that follow.

1)

```
int a;           // Defines integer a
int b;           // Defines integer b
int c;           // Defines integer c

task main()
{
  a = 3;
  b = a * 4;
  c = b + 6;
  c /= 9;
  c += 2;
  a = 10 * (c+3)
}
```

a) How can the integer definitions be written on one line? Write the statement below.

\_\_\_\_\_

b) What is the final value of variable *a*? \_\_\_\_\_

2)

```
#define MOVE_TIME 200
#define TURN_TIME 100

task main()
{
    repeat(4)
    {
        OnFwd(OUT_A + OUT_C);
        Wait(MOVE_TIME);
        OnRev(OUT_A);
        Wait(TURN_TIME);
    }
    Off(OUT_A + OUT_C);
}
```

a) Explain *exactly* what is going on in the program above. **Be specific** about power levels and ports.

---

---

---

b) The program above is downloaded and run on Tankbot. Sketch Tankbot's path of motion below. The start point is given. Assume that the robot makes a 90-degree turn when the motors are turning in opposite directions for 1 second.

**Start**



**Directions:** For each of the given programs, answer the questions that follow.

3)

```
#define Forward_Time 100

task main()
{
    SetPower(OUT_A + OUT_C, 3);
    OnFwd(OUT_A + OUT_C);
    Wait(Forward_Time);

    repeat(5)
    {
        On(OUT_B);           // A lamp is connected in Port B.
        Wait(50);
        Off(OUT_A + OUT_B + OUT_C);
    }
}
```

a) Explain *exactly* what is going on in the program above. **Be specific** about power levels and ports.

---

---

---

b) How many seconds do motors A and C run forward before they are turned off? \_\_\_\_\_

4)

```
int aaa;
int bbb, int ccc;

task main()
{
    aaa = 10;
    bbb = 20 * 5;
    ccc = bbb;
    ccc /= aaa;
    ccc -= 5;
    aaa = 3 * (ccc + 4);
}
```

a) What is the final value of the variable ccc? \_\_\_\_\_

b) What is the final value of the variable aaa? \_\_\_\_\_

5)

```
int power_level;

task main()
{
    power_level = 0;
    repeat(5)
    {
        SetPower(OUT_A + OUT_C, power_level);
        OnFwd(OUT_A + OUT_C);
        Wait(200);
        power_level += 1;
    }
    Off(OUT_A + OUT_C);
}
```

a) Explain *exactly* what is going on in the program above. **Be specific** about power levels and ports.

---

---

---