

Algorithms for Game Development

Assignment 5: Alchemical Warfare - Brew, Trap, and Splash Your Way to Victory

In this assignment we have been asked to add onto the roguelike game by adding new mechanics that include potion effects, traps, ranged ammo systems and splash potions. These changes required changing multiple core gameplay mechanics including combat, inventory and item interactions. This report shows the features added/changed and how they were implemented.

Changes Made

Part 1: Potion of Confusion

I added a new potion called the Potion of Confusion. When thrown or consumed it causes effected creatures to move in random directions for 10 turns. This adds tactical control for the player to confuse different groups of monsters except fungus. To do this I added a new effect called confused and I added a new isConfused method to creature, all enemy ai classes where changed (bar fungus) to check for confusion and act randomly when effected.

Code

```
1 usage
277 public Item newPotionOfConfusion2(int depth)
278 {
279     Item potion = new Item( glyph: '!', AsciiPanel.brightMagenta, name: "potion of confusion");
280     potion.setSplashRadius(1);
281     potion.setQuaffEffect(new Effect( duration: 10, name: "confused") {
282         1 usage
283         public void start(Creature c) { c.doAction( message: "look confused"); }
284         1 usage
285         public void end(Creature c) { c.doAction( message: "seem less confused"); }
286         4 usages
287         public void update(Creature c) { }
288     });
289     return potion;
290 }
```

stuffFactory.java

```
3 usages
571 public boolean isConfused()
572 {
573     return effect( name: "confused") != null;
574 }
575
```

creature.java

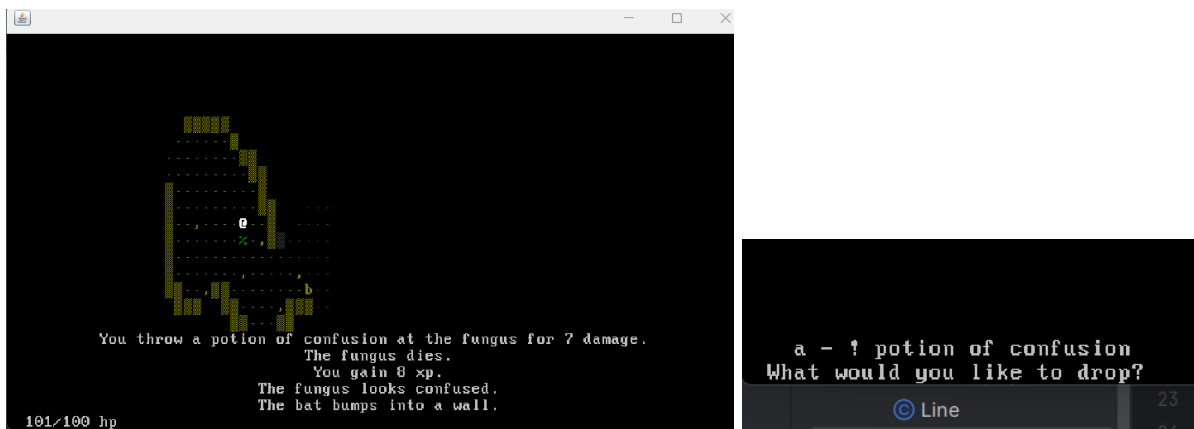
```

3 usages
13 ③↑ public void onUpdate()
14  {
15      if (creature.isConfused())
16      {
17          int mx = (int)(Math.random() * 3) - 1;
18          int my = (int)(Math.random() * 3) - 1;
19          creature.moveBy(mx, my, mz: 0);
20          return;
21      }
22

```

All enemy classes bar fungus (zombieAI.java, GoblinAI.java, BatAI.java)

Screenshots



Part 2: Traps

I added a new Trap class to allow for placement of tile based traps. These traps use effects like poison when stepped on. Traps were placed randomly or near the player using the stuffFactory.java, and trigger code was added in Creature moveBy()

Code

```
9 usages
5 public class Trap
6 {
7     2 usages
    private char glyph;
8     2 usages
    private Color color;
9     2 usages
    private String name;
10    2 usages
    private int x, y, z;
11    2 usages
    private Effect effect;
12
```

trap.java

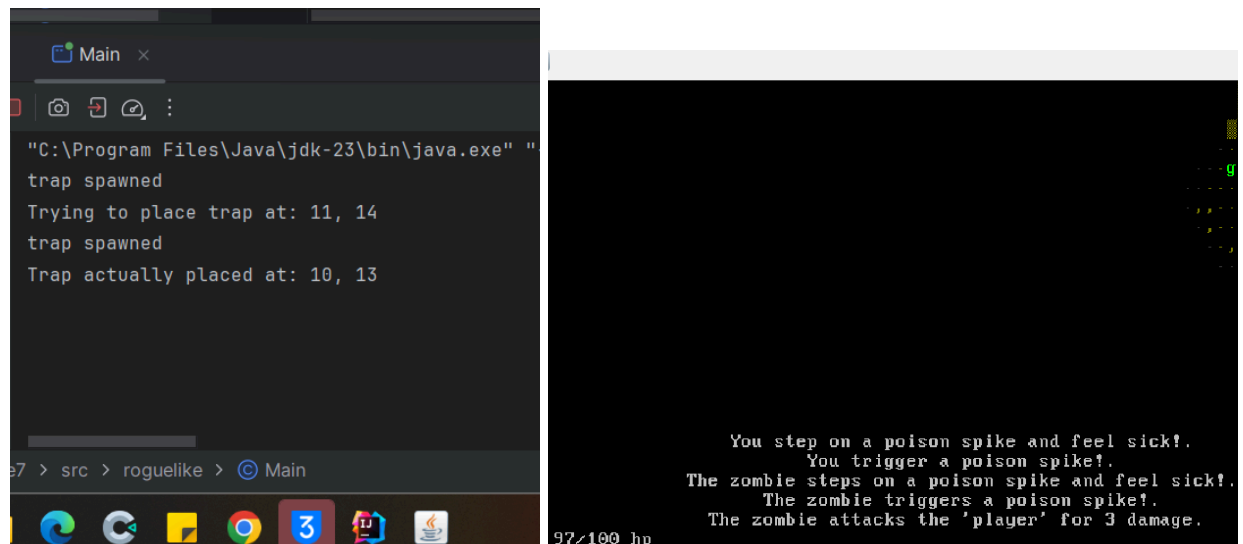
```
155 }
156 Trap trap = world.trap( x: x + mx, y: y + my, z: z + mz);
157 if (trap != null && trap.effect() != null)
158 {
159     this.addEffect(trap.effect());
160     doAction( message: "trigger a %s!", trap.name());
161 }
162
163
```

Creature.java inside the moveby method

```
241 public Trap newPoisonTrap(int depth)
242 {
243     System.out.println("trap spawned");
244     Trap trap = new Trap( glyph: '^', AsciiPanel.green, name: "poison spike");
245
246     trap.setEffect(new Effect( duration: 20, name: "poison")
247     {
248         1 usage
249         public void start(Creature creature)
250         {
251             creature.doAction( message: "step on a poison spike and feel sick");
252         }
253
254         4 usages
255         public void update(Creature creature)
256         {
257             super.update(creature);
258             creature.modifyHp( amount: -1);
259         }
260
261         1 usage
262         public void end(Creature creature)
263         {
264             creature.doAction( message: "feel better");
265         }
266     });
267     return trap;
268 }
```

stuffactory.java

Screenshots



Part 3: Ranged Weapon and Ammo

Bows now need ammo to shoot. Arrows are stored in quivers which track the remaining ammo. If a player runs out a warning message is shown and the attack is cancelled. This allows for better inventory management. I did this by adding ammo type and count to the item class, create rangedweaponattack for updated to check and use arrows and getAmmo helps find matching ammo in players inv.

Code

```
45     2 usages
    private String ammoType;
    3 usages
46     private int ammoCount;
47
    2 usages
48 > public void setAmmoType(String type) { this.ammoType = type; }
    no usages
72 > public String ammoType() { return ammoType; }
76
    1 usage
77 > public void setAmmoCount(int count) { this.ammoCount = count; }
    no usages
81     public int ammoCount()
82     {
83         return ammoCount;
84     }
    1 usage
85 > public void modifyAmmoCount(int amount) { this.ammoCount += amount; }
89
```

item.java

```
464
465     2 usages
    public void rangedWeaponAttack(Creature other)
466     {
467         Item bow = weapon;
468         String ammoType = bow.ammoType();
469
470         if (ammoType != null)
471         {
472             Item quiver = inventory.getAmmo(ammoType);
473
474             if (quiver == null || quiver.ammoCount() <= 0)
475             {
476                 notify( message: "Out of %ss!", ammoType);
477                 return;
478             }
479
480             quiver.modifyAmmoCount( amount: -1);
481         }
482
483         commonAttack(other, attack: attackValue / 2 + bow.rangedAttackValue(
484     }
485
```

creature.java

```

1 usage
267 public Item newQuiver(int depth)
268 {
269     Item item = new Item( glyph: '}', AsciiPanel.brightYellow, name: "quiver of arrows");
270     item.setAmmoType("arrow");
271     item.setAmmoCount(10);
272     return item;
273 }
274

```

stufffactory.java

Screenshots



Part 4: Splash Potions

Some potions like the new poison one and confusion potion now effect multiple enemies using a splash radius (gets all nearby enemies. When thrown any creature within a 1 tile radius gets the potions effect.

Code

```
2 usages
90     private int splashRadius = 0;
2 usages
91 >     public void setSplashRadius(int radius) { this.splashRadius = radius; }
95
no usages
96     public int splashRadius()
97     {
98         return splashRadius;
99     }
100
```

item.java

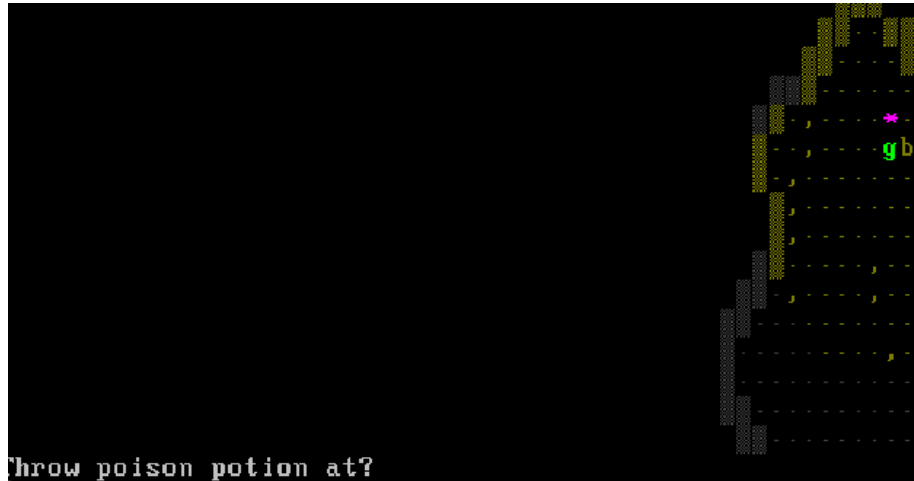
```
424 @ private void throwAttack(Item item, Creature target)
425 {
426     int radius = item.splashRadius();
427
428     for (Creature c : neighbors8(target.x, target.y, target.z))
429     {
430         if (c == null) continue;
431         if (item.quaffEffect() != null)
432         {
433             c.addEffect(item.quaffEffect());
434             c.doAction(message: "get splashed by the %s!", item.name());
435         }
436     }
437
438     commonAttack(target, attack: attackValue / 2 + item.thrownAttackValue(),
439                 action: "throw a %s at the %s for %d damage", item.name(), target.name());
440 }
441
```

Creature.java

```
1 usage
442 public List<Creature> neighbors8(int cx, int cy, int cz)
443 {
444     List<Creature> list = new ArrayList<Creature>();
445
446     for (int ox = -1; ox <= 1; ox++)
447     {
448         for (int oy = -1; oy <= 1; oy++)
449         {
450             if (!(ox == 0 && oy == 0))
451             {
452                 Creature other = world.creature(x: cx + ox, y: cy + oy, cz);
453                 if (other != null)
454                     list.add(other);
455             }
456         }
457     }
458
459     return list;
460 }
```

creature.java

Screenshots



Conclusion

In conclusion, I implemented all the four features we were asked to add into the already existing game, confusion potions, traps that have effects/damage, bows with quivers which tell you when empty and splash positions the effect multiple enemies at the same time, this assignment though me a lot about combat and its mechanics , how to reuse already existing effects with traps and potions. I really did enjoy improving this game and over all 5 of these assignments I have really enjoyed using the ascii layout and will definitely mess around with it over the summer holidays and maybe create my own little game. Overall I'm quite happy with the final result and if I had more time I would polish the game a bit more.