課題３：シューティングゲーム

シューティングゲームを作ってみましょう。

自機を操作して UFO から出てくるエイリアンをよけながら弾を UFO に当てましょう。

プログラムリスト 1(no3-1.rb)：背景

```
001: # coding: utf-8
002:
003: require 'r2d'
004:
005: w = window
006:
007: MAX_HP = 500
008: BOTTOM = 360
009:
010: Rectangle.new(0, 0, w.w, BOTTOM, [46, 41, 48, 255])
011: Text.new(20, BOTTOM + 10, 20,
012:          'MISSION:UFOを撃墜せよ！「スペース」で弾を打つ「→」「←」で移動')
013:
014: window :show
```

プログラムリスト 2(no3-2.rb)：キャラ表示（まだ動かない）

```
001: # coding: utf-8
002:
003: require 'r2d'
004:
005: w = window
006:
007: MAX_HP = 500
008: BOTTOM = 360
009:
010: Rectangle.new(0, 0, w.w, BOTTOM, [46, 41, 48, 255])
011: Text.new(20, BOTTOM + 10, 20,
012:          'MISSION:UFO を撃墜せよ！「スペース」で弾を打つ「→」「←」で移動')
013:
014: ufo_hp = MAX_HP
015: ufo_gage = Rectangle.new(10, 410, MAX_HP, 20, 'yellow')
016: Text.new(520, 410, 20, 'UFO HP')
017:
018: my_hp = MAX_HP
019: my_gage = Rectangle.new(10, 450, MAX_HP, 20, 'red')
020: Text.new(520, 450, 20, 'YOU HP')
021:
022: ufo = Image.new(50, 10, 'ufo.png')
023: ufo.width = 200
024: ufo.height = 150
025:
026: gun = Image.new(300, BOTTOM - 115, 'gun.png')
027:
028: window :show
```

プログラムリスト 3(no3-3.rb)：自機の移動と弾の表示


```
001: # coding: utf-8
002:
003: require 'r2d'
004:
005: w = window
006:
007: MAX_HP = 500
008: BOTTOM = 360
009:
010: Rectangle.new(0, 0, w.w, BOTTOM, [46, 41, 48, 255])
011: Text.new(20, BOTTOM + 10, 20,
012:          'MISSION:UFO を撃墜せよ！「スペース」で弾を打つ「→」「←」で移動')
013:
014: ufo_hp = MAX_HP
015: ufo_gage = Rectangle.new(10, 410, MAX_HP, 20, 'yellow')
016: Text.new(520, 410, 20, 'UFO HP')
017:
018: my_hp = MAX_HP
019: my_gage = Rectangle.new(10, 450, MAX_HP, 20, 'red')
020: Text.new(520, 450, 20, 'YOU HP')
021:
022: ufo = Image.new(50, 10, 'ufo.png')
023: ufo.width = 200
024: ufo.height = 150
025:
026: gun = Image.new(300, BOTTOM - 115, 'gun.png')
027:
028: bomb = []
029: playing = true
030:
031: on_key 'space' do
032:   if playing
033:     bomb << Rectangle.new(gun.x + 50, BOTTOM - 125, 10, 20, 'random')
034:   end
035: end
036:
037: key_down 'left' do
038:   gun.x = (gun.x - 5) % w.w
039: end
040:
041: key_down 'right' do
042:   gun.x = (gun.x + 5) % w.w
043: end
044:
045: window :show
```
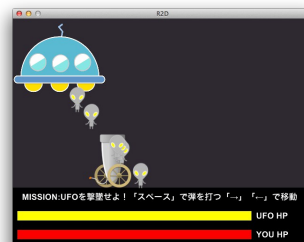
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プログラムリスト 4(no3-4.rb)：エイリアンと弾のアニメーション


```
001: # coding: utf-8
002:
003: require 'r2d'
004:
005: w = window
006:
007: MAX_HP = 500
008: BOTTOM = 360
009:
010: Rectangle.new(0, 0, w.w, BOTTOM, [46, 41, 48, 255])
011: Text.new(20, BOTTOM + 10, 20,
012:          'MISSION:UFO を撃墜せよ！「スペース」で弾を打つ「→」「←」で移動')
013:
014: ufo_hp = MAX_HP
015: ufo_gage = Rectangle.new(10, 410, MAX_HP, 20, 'yellow')
016: Text.new(520, 410, 20, 'UFO HP')
017:
018: my_hp = MAX_HP
019: my_gage = Rectangle.new(10, 450, MAX_HP, 20, 'red')
020: Text.new(520, 450, 20, 'YOU HP')
021:
022: ufo = Image.new(50, 10, 'ufo.png')
023: ufo.width = 200
024: ufo.height = 150
025:
026: gun = Image.new(300, BOTTOM - 115, 'gun.png')
027:
028: bomb = []
029: enemy = []
030: playing = true
031:
032: on_key 'space' do
033:   if playing
034:     bomb << Rectangle.new(gun.x + 50, BOTTOM - 125, 10, 20, 'random')
035:   end
036: end
037:
038: key_down 'left' do
039:   gun.x = (gun.x - 5) % w.w
040: end
041:
042: key_down 'right' do
043:   gun.x = (gun.x + 5) % w.w
044: end
045:
046: switch = true
047:
048: update do
049:   if !playing
050:     next
```

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```
051:    end
052:    if rand(30) == 0
053:      enemy << Image.new(ufo.x + 100, 120, 'enemy.png')
054:    end
055:
056:    bomb.each do |b|
057:      b.y -= 6
058:    end
059:
060:    enemy.each do |e|
061:      e.y += 6
062:    end
063:
064:    if switch
065:      ufo.x += 5
066:      if ufo.x > (w.w - 200)
067:        switch = false
068:      end
069:    else
070:      ufo.x -= 5
071:      if ufo.x <= 0
072:        switch = true
073:      end
074:    end
075: end
076:
077: window :show
```

プログラムリスト 5(no3-5.rb)：弾とエイリアンのあたり判定

```
001: # coding: utf-8
002:
003: require 'r2d'
004:
005: w = window
006:
007: MAX_HP = 500
008: BOTTOM = 360
009:
010: Rectangle.new(0, 0, w.w, BOTTOM, [46, 41, 48, 255])
011: Text.new(20, BOTTOM + 10, 20,
012:          'MISSION:UFO を撃墜せよ！「スペース」で弾を打つ「→」「←」で移動')
013:
014: ufo_hp = MAX_HP
015: ufo_gage = Rectangle.new(10, 410, MAX_HP, 20, 'yellow')
016: Text.new(520, 410, 20, 'UFO HP')
017:
018: my_hp = MAX_HP
019: my_gage = Rectangle.new(10, 450, MAX_HP, 20, 'red')
020: Text.new(520, 450, 20, 'YOU HP')
021:
022: ufo = Image.new(50, 10, 'ufo.png')
023: ufo.width = 200
024: ufo.height = 150
025:
026: gun = Image.new(300, BOTTOM - 115, 'gun.png')
027:
028: bomb = []
029: enemy = []
030: playing = true
031:
032: on_key 'space' do
033:   if playing
034:     bomb << Rectangle.new(gun.x + 50, BOTTOM - 125, 10, 20, 'random')
035:   end
036: end
037:
038: key_down 'left' do
039:   gun.x = (gun.x - 5) % w.w
040: end
041:
042: key_down 'right' do
043:   gun.x = (gun.x + 5) % w.w
044: end
045:
046: def hit_check(e, m)
047:   r = e.x + e.width > m.x && e.x < m.x + m.width &&
048:     e.y + e.height > m.y && e.y < m.y + m.height
049:   if r || m.y < 0 || m.y > (BOTTOM - 50)
050:     m.remove
```

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```
051:   end
052:   return r
053: end
054:
055: switch = true
056:
057: update do
058:   if !playing
059:     next
060:   end
061:   if rand(30) == 0
062:     enemy << Image.new(ufo.x + 100, 120, 'enemy.png')
063:   end
064:
065:   bomb.each do |b|
066:     b.y -= 6
067:     if hit_check(ufo, b)
068:     end
069:   end
070:
071:   enemy.each do |e|
072:     e.y += 6
073:     if hit_check(gun, e)
074:     end
075:   end
076:
077:   if switch
078:     ufo.x += 5
079:     if ufo.x > (w.w - 200)
080:       switch = false
081:     end
082:   else
083:     ufo.x -= 5
084:     if ufo.x <= 0
085:       switch = true
086:     end
087:   end
088: end
089:
090: window :show
```

プログラムリスト 6(no3-6.rb)：残りエネルギー（HP）の変化

```
001: # coding: utf-8
002:
003: require 'r2d'
004:
005: w = window
006:
007: MAX_HP = 500
008: BOTTOM = 360
009:
010: Rectangle.new(0, 0, w.w, BOTTOM, [46, 41, 48, 255])
011: Text.new(20, BOTTOM + 10, 20,
012:          'MISSION:UFO を撃墜せよ！「スペース」で弾を打つ「→」「←」で移動')
013:
014: ufo_hp = MAX_HP
015: ufo_gage = Rectangle.new(10, 410, MAX_HP, 20, 'yellow')
016: Text.new(520, 410, 20, 'UFO HP')
017:
018: my_hp = MAX_HP
019: my_gage = Rectangle.new(10, 450, MAX_HP, 20, 'red')
020: Text.new(520, 450, 20, 'YOU HP')
021:
022: ufo = Image.new(50, 10, 'ufo.png')
023: ufo.width = 200
024: ufo.height = 150
025:
026: gun = Image.new(300, BOTTOM - 115, 'gun.png')
027:
028: bomb = []
029: enemy = []
030: playing = true
031:
032: on_key 'space' do
033:   if playing
034:     bomb << Rectangle.new(gun.x + 50, BOTTOM - 125, 10, 20, 'random')
035:   end
036: end
037:
038: key_down 'left' do
039:   gun.x = (gun.x - 5) % w.w
040: end
041:
042: key_down 'right' do
043:   gun.x = (gun.x + 5) % w.w
044: end
045:
046: def hit_check(e, m)
047:   r = e.x + e.width > m.x && e.x < m.x + m.width &&
048:     e.y + e.height > m.y && e.y < m.y + m.height
049:   if r || m.y < 0 || m.y > (BOTTOM - 50)
050:     m.remove
```

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```
051:   end
052:   return r
053: end
054:
055: def gage_mgt(gage, hp, max_hp)
056:   gage.width = (max_hp.to_f * hp / max_hp).to_i
057: end
058:
059: switch = true
060:
061: update do
062:   if !playing
063:     next
064:   end
065:   if rand(30) == 0
066:     enemy << Image.new(ufo.x + 100, 120, 'enemy.png')
067:   end
068:
069:   bomb.each do |b|
070:     b.y -= 6
071:     if hit_check(ufo, b)
072:       ufo_hp -= 1
073:       gage_mgt(ufo_gage, ufo_hp, MAX_HP)
074:     end
075:   end
076:
077:   enemy.each do |e|
078:     e.y += 6
079:     if hit_check(gun, e)
080:       my_hp -= 1
081:       gage_mgt(my_gage, my_hp, MAX_HP)
082:     end
083:   end
084:
085:   if switch
086:     ufo.x += 5
087:     if ufo.x > (w.w - 200)
088:       switch = false
089:     end
090:   else
091:     ufo.x -= 5
092:     if ufo.x <= 0
093:       switch = true
094:     end
095:   end
096: end
097:
098: window :show
```

プログラムリスト 7(no3.rb)：完成

```
001: # coding: utf-8
002:
003: require 'r2d'
004:
005: w = window
006:
007: MAX_HP = 500
008: BOTTOM = 360
009:
010: Rectangle.new(0, 0, w.w, BOTTOM, [46, 41, 48, 255])
011: Text.new(20, BOTTOM + 10, 20,
012:          'MISSION:UFO を撃墜せよ！「スペース」で弾を打つ「→」「←」で移動')
013:
014: ufo_hp = MAX_HP
015: ufo_gage = Rectangle.new(10, 410, MAX_HP, 20, 'yellow')
016: Text.new(520, 410, 20, 'UFO HP')
017:
018: my_hp = MAX_HP
019: my_gage = Rectangle.new(10, 450, MAX_HP, 20, 'red')
020: Text.new(520, 450, 20, 'YOU HP')
021:
022: ufo = Image.new(50, 10, 'ufo.png')
023: ufo.width = 200
024: ufo.height = 150
025:
026: gun = Image.new(300, BOTTOM - 115, 'gun.png')
027:
028: bomb = []
029: enemy = []
030: playing = true
031:
032: on_key 'space' do
033:   if playing
034:     bomb << Rectangle.new(gun.x + 50, BOTTOM - 125, 10, 20, 'random')
035:   end
036: end
037:
038: key_down 'left' do
039:   gun.x = (gun.x - 5) % w.w
040: end
041:
042: key_down 'right' do
043:   gun.x = (gun.x + 5) % w.w
044: end
045:
046: def hit_check(e, m)
047:   r = e.x + e.width > m.x && e.x < m.x + m.width &&
048:     e.y + e.height > m.y && e.y < m.y + m.height
049:   if r || m.y < 0 || m.y > (BOTTOM - 50)
050:     m.remove
```

```
051:   end
052:   return r
053: end
054:
055: def gage_mgt(gage, hp, max_hp)
056:   gage.width = (max_hp.to_f * hp / max_hp).to_i
057: end
058:
059: def final_message(msg, gage)
060:   Rectangle.new(100, 100, 440, 150, 'red')
061:   Text.new(150, 150, 50, msg)
062:   gage.width = 0
063: end
064:
065: switch = true
066:
067: update do
068:   if !playing
069:     next
070:   end
071:   if rand(30) == 0
072:     enemy << Image.new(ufo.x + 100, 120, 'enemy.png')
073:   end
074:
075:   bomb.each do |b|
076:     b.y -= 6
077:     if hit_check(ufo, b)
078:       ufo_hp -= 1
079:       gage_mgt(ufo_gage, ufo_hp, MAX_HP)
080:     end
081:   end
082:
083:   enemy.each do |e|
084:     e.y += 6
085:     if hit_check(gun, e)
086:       my_hp -= 1
087:       gage_mgt(my_gage, my_hp, MAX_HP)
088:     end
089:   end
090:
091:   if switch
092:     ufo.x += 5
093:     if ufo.x > (w.w - 200)
094:       switch = false
095:     end
096:   else
097:     ufo.x -= 5
098:     if ufo.x <= 0
099:       switch = true
100:     end
101:   end
102:
103:   if ufo_hp <= 0 && my_hp > 0
```

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```
104:     final_message('GAME CLEAR !!', ufo_gage)
105:     playing = false
106:   end
107:
108:   if ufo_hp > 0 && my_hp <= 0
109:     final_message('GAME ORVER...', my_gage)
110:     playing = false
111:   end
112: end
113:
114: window :show
```