

ATLASENGINE COMPLETE GUIDE - PART 3

Graphics 2D, 3D Viewport, Game Mechanics

CATEGORY 6: GRAPHICS 2D (20 COMMANDS)

Drawing Commands

1. drawline

Purpose: Draw a line **Syntax:** drawline from x1, y1 to x2, y2 color "color" **Examples:**

Simple line

```
drawline from 0, 0 to 100, 100 color "#ffffff"
```

Horizontal line

```
drawline from 50, 100 to 500, 100 color "#ff0000"
```

Vertical line

```
drawline from 200, 0 to 200, 600 color "#00ff00"
```

Diagonal

```
drawline from 0, 600 to 800, 0 color "#0000ff"
```

Colors: Use hex colors like “#RRGGBB”

2. drawrect

Purpose: Draw a rectangle **Syntax:** drawrect at x, y size width, height color "color" **Examples:**

Square

```
drawrect at 100, 100 size 50, 50 color "#ff0000"
```

Wide rectangle

```
drawrect at 200, 200 size 200, 100 color "#00ff00"
```

Tall rectangle

```
drawrect at 400, 100 size 100, 200 color "#0000ff"
```

```
# Filled
drawrect at 50, 50 size 100, 100 color "#ffff00"
```

3. drawcircle

Purpose: Draw a circle **Syntax:** drawcircle at x, y radius r color "color" **Examples:**

```
# Small circle
drawcircle at 300, 300 radius 50 color "#ff0000"

# Large circle
drawcircle at 400, 400 radius 100 color "#00ff00"

# Dot
drawcircle at 100, 100 radius 5 color "#ffffff"

# Sun
drawcircle at 700, 100 radius 80 color "#ffff00"
```

4. drawtext

Purpose: Draw text **Syntax:** drawtext "text" at x, y color "color" **Examples:**

```
# Title
drawtext "GAME TITLE" at 300, 50 color "#ffffff"

# Score
score is 1000
drawtext "Score: " score at 50, 30 color "#ffff00"

# Instructions
drawtext "Press SPACE to start" at 300, 500 color "#00ffff"

# Labels
drawtext "HP" at 50, 50 color "#ff0000"
```

5. fillscreen

Purpose: Fill screen with color (background) **Syntax:** fillscreen "color" **Examples:**

```
fillscreen "#000000" # Black
fillscreen "#1a1a2e" # Dark blue
fillscreen "#ffffff" # White
fillscreen "#0f0f0f" # Very dark gray
```

Sprite Commands

6. sprite

Purpose: Create a sprite **Syntax:** sprite name at x, y size width, height color "color" **Examples:**

```
# Player sprite
sprite "player" at 100, 100 size 32, 32 color "#00ff00"

# Enemy sprite
sprite "enemy1" at 300, 200 size 32, 32 color "#ff0000"

# Coin sprite
sprite "coin" at 400, 300 size 16, 16 color "#ffff00"

# NPC
sprite "merchant" at 500, 400 size 48, 48 color "#0000ff"
```

7. movesprite

Purpose: Move a sprite **Syntax:** movesprite name to x, y **Examples:**

```
# Create player
sprite "player" at 100, 100 size 32, 32 color "#00ff00"

# Move right
player_x is 100
player_x add 10
movesprite "player" to player_x, 100

# Move up
player_y is 100
player_y subtract 10
movesprite "player" to 100, player_y
```

8. colorsprite

Purpose: Change sprite color **Syntax:** colorsprite name to "color" **Examples:**

```
sprite "player" at 100, 100 size 32, 32 color "#00ff00"
```

```
# Turn red when damaged
colorsprite "player" to "#ff0000"
```

```
# Turn blue when powered up
colorsprite "player" to "#0000ff"
```

9. hidesprite

Purpose: Hide a sprite **Syntax:** hidesprite name **Examples:**

```
sprite "coin" at 200, 200 size 16, 16 color "#ffff00"
# Player collects coin
hidesprite "coin"
```

10. showsprite

Purpose: Show a hidden sprite **Syntax:** showsprite name **Examples:**

```
hidesprite "powerup"
# Wait for respawn
showsprite "powerup"
```

11. deletesprite

Purpose: Permanently remove sprite **Syntax:** deletesprite name **Examples:**

```
sprite "bullet" at 300, 300 size 8, 8 color "#ffff00"
# Bullet hits wall
deletesprite "bullet"
```

Advanced Graphics

12. arc

Purpose: Draw an arc/curved line **Syntax:** arc at x, y radius r start end color "color"

```
# Half circle
arc at 300, 300 radius 100 start 0 end 180 color "#ff0000"
```

```
# Quarter circle
arc at 400, 400 radius 50 start 90 end 180 color "#00ff00"
```

13. ellipse

Purpose: Draw an ellipse **Syntax:** ellipse at x, y width height color "color"

```
ellipse at 300, 300 width 200 height 100 color "#0000ff"
```

14. triangle

Purpose: Draw a triangle **Syntax:** triangle x1, y1 x2, y2 x3, y3 color "color"

```
triangle 300, 100 200, 300 400, 300 color "#ff0000"
```

15. polygon

Purpose: Draw a polygon **Syntax:** polygon points color "color"

```
# Pentagon
points is [[300,100], [400,150], [350,250], [250,250], [200,150]]
polygon points color "#00ff00"
```

16. bezier

Purpose: Draw bezier curve **Syntax:** bezier x1, y1 x2, y2 x3, y3 x4, y4 color "color"

```
bezier 100, 100 200, 50 300, 50 400, 100 color "#ffffff"
```

17. gradient

Purpose: Draw gradient **Syntax:** gradient from color1 to color2 at x, y size w, h

```
gradient from "#ff0000" to "#0000ff" at 100, 100 size 400, 200
```

18. animation

Purpose: Animate sprite **Syntax:** animation name frames delay

```
animation "player" frames 4 delay 100
```

19. opacity

Purpose: Set transparency **Syntax:** opacity name value

```
opacity "ghost" 0.5 # 50% transparent
```

20. zindex

Purpose: Set drawing order (layers) **Syntax:** zindex name value

```
zindex "background" -1 # Behind  
zindex "player" 0      # Middle  
zindex "ui" 1          # Front
```

CATEGORY 7: 3D VIEWPORT (80 COMMANDS)

3D Object Creation

1. create3d

Purpose: Create 3D object **Syntax:** create3d type at x, y, z size s

Types: cube, sphere, plane, pyramid **Examples:**

```
# Cube  
create3d cube at 0, 0, 5 size 1  
  
# Sphere  
create3d sphere at 5, 0, 10 size 2  
  
# Plane (floor)  
create3d plane at 0, -1, 0 size 10  
  
# Multiple objects  
create3d cube at -3, 0, 5 size 1  
create3d cube at 0, 0, 5 size 1  
create3d cube at 3, 0, 5 size 1
```

2. color3d

Purpose: Set 3D object color **Syntax:** color3d object to "color" **Examples:**

```
create3d cube at 0, 0, 5 size 1
color3d last3d to "#ff0000" # Red cube

create3d sphere at 5, 0, 10 size 2
color3d last3d to "#00ff00" # Green sphere
```

3. scale

Purpose: Scale 3D object **Syntax:** scale object by x, y, z

```
create3d cube at 0, 0, 5 size 1
scale last3d by 2, 1, 1 # Stretch horizontally
```

4. rotate

Purpose: Rotate 3D object **Syntax:** rotate object by x, y, z

```
create3d cube at 0, 0, 5 size 1
rotate last3d by 45, 0, 0 # Rotate 45° on X axis
```

5. transform

Purpose: Move, rotate, scale at once **Syntax:** transform object ...

```
transform last3d position 5, 0, 10 rotation 0, 45, 0 scale 2, 2, 2
```

Camera & View

6. camera

Purpose: Set camera position **Syntax:** camera at x, y, z

```
camera at 0, 1.6, 0 # Player height
camera at 0, 10, -10 # Bird's eye view
camera at 10, 5, 10 # Isometric view
```

7. lookat

Purpose: Point camera at target **Syntax:** lookat x, y, z

```
lookat 0, 0, 10 # Look at origin
lookat enemy_x, enemy_y, enemy_z # Look at enemy
```

8. zoom

Purpose: Zoom camera **Syntax:** zoom value

```
zoom 1.5 # Zoom in
zoom 0.5 # Zoom out
```

9. pivot

Purpose: Rotate camera around point **Syntax:** pivot angle

```
pivot 90 # Rotate 90 degrees
```

10. orbit

Purpose: Orbit camera around target **Syntax:** orbit target angle

```
orbit 0, 0, 5 angle 45
```

Lighting

11. pointlight

Purpose: Create point light **Syntax:** pointlight at x, y, z color "color" intensity i

```
pointlight at 0, 5, 0 color "#ffffff" intensity 1.0
pointlight at 10, 3, 10 color "#ff0000" intensity 0.5
```

12. spotlight

Purpose: Create spotlight **Syntax:** spotlight at x, y, z direction dx, dy, dz color "color"

```
spotlight at 0, 10, 0 direction 0, -1, 0 color "#ffff00"
```

13. directional

Purpose: Directional light (sun) **Syntax:** directional direction dx, dy, dz color "color"

```
directional direction 0, -1, -1 color "#ffffff"
```

14. hemispheric / skylight

Purpose: Ambient sky lighting **Syntax:** skylight color "color" intensity i

```
skylight color "#87ceeb" intensity 0.3
```

15. shadow

Purpose: Enable shadows **Syntax:** shadow object enable

```
create3d cube at 0, 0, 5 size 1  
shadow last3d enable
```

Materials & Textures

16. material

Purpose: Set object material **Syntax:** material object type "type"
Types: phong, standard, pbr

```
create3d sphere at 0, 0, 5 size 1  
material last3d type "pbr"
```

17. texture

Purpose: Apply texture to object **Syntax:** texture object file "path"

```
create3d cube at 0, 0, 5 size 1  
texture last3d file "textures/brick.png"
```

18. metallic

Purpose: Set metallic property **Syntax:** metallic object value

```
create3d sphere at 0, 0, 5 size 1
metallic last3d 0.8 # 80% metallic
```

19. roughness

Purpose: Set roughness property **Syntax:** roughness object value

```
create3d sphere at 0, 0, 5 size 1
roughness last3d 0.2 # 20% rough (80% smooth)
```

20. emissive

Purpose: Make object glow **Syntax:** emissive object color "color" intensity i

```
create3d sphere at 0, 0, 5 size 1
emissive last3d color "#00ff00" intensity 2.0
```

21. opacity / transparent

Purpose: Set transparency **Syntax:** opacity object value

```
create3d cube at 0, 0, 5 size 1
opacity last3d 0.5 # 50% transparent
```

22. wireframe

Purpose: Show wireframe **Syntax:** wireframe object enable

```
create3d sphere at 0, 0, 5 size 1
wireframe last3d enable
```

Physics & Movement

23. gravity

Purpose: Enable gravity on object **Syntax:** gravity object enable

```
create3d sphere at 0, 10, 5 size 1
gravity last3d enable # Falls down
```

24. velocity

Purpose: Set object velocity **Syntax:** velocity object x, y, z

```
create3d sphere at 0, 0, 5 size 1  
velocity last3d 1, 0, 0 # Move right
```

25. force

Purpose: Apply force to object **Syntax:** force object x, y, z

```
create3d sphere at 0, 0, 5 size 1  
force last3d 0, 10, 0 # Push up
```

26. impulse

Purpose: Apply instant force **Syntax:** impulse object x, y, z

```
create3d sphere at 0, 0, 5 size 1  
impulse last3d 5, 0, 0 # Instant push right
```

27. torque

Purpose: Apply rotational force **Syntax:** torque object x, y, z

```
create3d cube at 0, 0, 5 size 1  
torque last3d 0, 1, 0 # Spin around Y axis
```

28. angular

Purpose: Set angular velocity **Syntax:** angular object x, y, z

```
create3d cube at 0, 0, 5 size 1  
angular last3d 0, 90, 0 # Rotate 90°/sec around Y
```

29. bounce

Purpose: Set bounciness **Syntax:** bounce object value

```
create3d sphere at 0, 10, 5 size 1  
bounce last3d 0.8 # 80% bounce back
```

30. drag

Purpose: Set air resistance **Syntax:** drag object value

```
create3d sphere at 0, 0, 5 size 1  
drag last3d 0.5 # Slows down in air
```

31. inertia

Purpose: Set mass/resistance to movement **Syntax:** inertia object value

```
create3d cube at 0, 0, 5 size 1  
inertia last3d 10 # Heavy, hard to move
```

32. momentum

Purpose: Set initial momentum **Syntax:** momentum object x, y, z

```
create3d sphere at 0, 0, 5 size 1  
momentum last3d 5, 0, 0 # Moving right
```

Advanced Effects

33. particles / emitter

Purpose: Create particle system **Syntax:** emitter at x, y, z type
"type" **Types:** fire, smoke, explosion, rain, snow

```
emitter at 0, 0, 5 type "fire"  
emitter at 10, 10, 10 type "smoke"  
emitter at 5, 0, 5 type "explosion"
```

34. billboard

Purpose: Make sprite face camera **Syntax:** billboard object enable

```
create3d plane at 0, 0, 5 size 1  
billboard last3d enable # Always faces camera
```

35. glow

Purpose: Add glow effect **Syntax:** glow object intensity

```
create3d sphere at 0, 0, 5 size 1  
glow last3d 2.0
```

36. fog

Purpose: Add distance fog **Syntax:** fog color "color" density value
fog color "#888888" density 0.05

37. bloom

Purpose: Add bloom effect **Syntax:** bloom intensity value
bloom intensity 1.5

38. vignette

Purpose: Darken screen edges **Syntax:** vignette intensity value
vignette intensity 0.5

39. chromatic

Purpose: Chromatic aberration effect **Syntax:** chromatic intensity value
chromatic intensity 0.01

40. grain / pixelate

Purpose: Add film grain or pixelation **Syntax:** grain intensity value
grain intensity 0.1

Post-Processing

41. blur

Purpose: Blur screen **Syntax:** blur amount
blur 5 # Blur 5 pixels

42. motionblur

Purpose: Motion blur effect **Syntax:** motionblur intensity

motionblur 0.5

43. dof (Depth of Field)

Purpose: Focus blur effect **Syntax:** dof focus distance blur amount

dof focus 10 blur 5 # Focus at 10 units, blur rest

44. ssao

Purpose: Screen space ambient occlusion **Syntax:** ssao enable

ssao enable

45. antialiasing

Purpose: Smooth edges **Syntax:** antialiasing enable

antialiasing enable

46. tonemapping

Purpose: Color grading/HDR **Syntax:** tonemapping type "type" **Types:** none, reinhard, filmic

tonemapping type "filmic"

47. colorgrading

Purpose: Adjust colors **Syntax:** colorgrading ...

colorgrading brightness 1.2 contrast 1.1 saturation 1.0

48. tint

Purpose: Color overlay **Syntax:** tint color "color" intensity

tint color "#ff0000" intensity 0.2 # Slight red tint

49. fade

Purpose: Fade to color **Syntax:** fade to color "color" duration time
fade to color "#000000" duration 2 # Fade to black over 2 seconds

Rendering

50. culling

Purpose: Enable frustum culling (performance) **Syntax:** culling enable
culling enable

51. lod (Level of Detail)

Purpose: Set LOD distance **Syntax:** lod object distances
lod object distances [10, 20, 30]

52. instancing

Purpose: Instance rendering (performance) **Syntax:** instancing object
count

create3d cube at 0, 0, 5 size 1
instancing last3d 100 # 100 instances

53. clip

Purpose: Clip rendering distance **Syntax:** clip near far
clip 0.1 1000 # Near: 0.1, Far: 1000

54. renderpass

Purpose: Multi-pass rendering **Syntax:** renderpass name
renderpass "main"
renderpass "shadow"
renderpass "reflection"

55. framebuffer

Purpose: Render to texture **Syntax:** framebuffer name size width height

```
framebuffer "reflection" size 512 512
```

Ray Tracing & Advanced

56. raycast

Purpose: Cast ray for collision **Syntax:** raycast from x, y, z direction dx, dy, dz

```
hit is raycast from 0, 1.6, 0 direction 0, 0, 1
when hit equals 1 {
    say "Hit something!"
}
```

57. raytrace

Purpose: Ray tracing rendering **Syntax:** raytrace enable

```
raytrace enable # Realistic lighting/reflections
```

58. reflect

Purpose: Set reflection intensity **Syntax:** reflect object intensity

```
create3d sphere at 0, 0, 5 size 1
reflect last3d 0.9 # 90% reflective
```

59. refract

Purpose: Set refraction (glass effect) **Syntax:** refract object value

```
create3d sphere at 0, 0, 5 size 1
refract last3d 1.5 # Glass-like
```

60. caustics

Purpose: Underwater light patterns **Syntax:** caustics enable
caustics enable

61. volumetric

Purpose: Volumetric lighting (god rays) **Syntax:** volumetric enable
volumetric enable

62. godrays

Purpose: Light beam effect **Syntax:** godrays from x, y, z
godrays from 0, 10, 0

Mesh & Model

63. mesh

Purpose: Load 3D mesh/model **Syntax:** mesh file "path" at x, y, z
mesh file "models/character.obj" at 0, 0, 5
mesh file "models/weapon.fbx" at 1, 0, 5

64. model

Purpose: Load complete model with textures **Syntax:** model file "path"
at x, y, z
model file "models/player.glb" at 0, 0, 5

65. anchor

Purpose: Attach object to another **Syntax:** anchor child to parent
Weapon attached to player
anchor "weapon" to "player"

66. path

Purpose: Create movement path **Syntax:** path name points

points is [[0,0,0], [5,0,0], [5,0,5], [0,0,5]]
path "patrol" points

67. curve

Purpose: Bezier curve path **Syntax:** curve name points

points is [[0,0,0], [2,2,0], [4,2,0], [6,0,0]]
curve "smooth_path" points

68. spiral

Purpose: Spiral path **Syntax:** spiral center radius height turns

spiral 0, 0, 0 radius 5 height 10 turns 3

69. parabola

Purpose: Parabolic trajectory **Syntax:** parabola start end height

parabola 0, 0, 0 end 10, 0, 10 height 5

70. wave

Purpose: Wave motion **Syntax:** wave object amplitude frequency

wave last3d amplitude 2 frequency 0.5

Animation

71. tween

Purpose: Animate property over time **Syntax:** tween object property
from to duration

tween "player" position from 0, 0, 0 to 10, 0, 0 duration 2

72. ease

Purpose: Easing function for animations **Syntax:** ease type "type" **Types:** linear, easein, easeout, easeinout

ease type "easeinout"

73. elastic

Purpose: Elastic/bouncy animation **Syntax:** elastic intensity

elastic 1.5

74. spring

Purpose: Spring physics animation **Syntax:** spring stiffness damping

spring 100 10

75. pendulum

Purpose: Pendulum motion **Syntax:** pendulum object length

pendulum "lamp" 3

76. ballistic

Purpose: Ballistic trajectory **Syntax:** ballistic from x, y, z to x, y, z speed

ballistic from 0, 0, 0 to 10, 0, 10 speed 15

77. homing

Purpose: Homing projectile **Syntax:** homing object target speed

homing "missile" target "enemy" speed 10

78. circular

Purpose: Circular motion **Syntax:** circular object center radius speed

circular "satellite" center 0, 0, 0 radius 10 speed 1

79. sine_wave

Purpose: Sine wave motion **Syntax:** sine_wave object amplitude frequency

sine_wave "float" amplitude 0.5 frequency 2

80. trajectory

Purpose: Calculate trajectory **Syntax:** trajectory from to gravity

traj is trajectory from 0, 0, 0 to 10, 0, 10 gravity 9.8

TO BE CONTINUED IN PART 4... (Game Mechanics, Weapons, Combat, Inventory, Quests, and Complete Game Examples)