

## LAMPIRAN

### PROGRAM PEMBANGKITAN BILANGAN RANDOM UNTUK SAMPEL BOOTSTRAP LEVEL I

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Program Simulasi ( Input, output );
Uses crt;
Var J, P, N, I, Sum, Tem :longint;
    u, Rata: real;
Const p1 = 50 ; p2 = 44 ; p3 = 102; p4 = 72 ; p5 = 22 ;    p6 = 39 ;
      p7 = 3  ; p8 = 15 ; p9 = 197; p10= 188; p11= 79 ; p12= 88 ;
      p13= 46 ; p14= 5  ; p15= 5  ; p16= 36 ; p17= 22 ; p18= 139;
      p19= 210; p20= 97 ; p21= 30 ; p22= 23 ; p23= 13 ; p24= 14 ;
begin
clrscr;
for J:=1 to 100 do
  begin
    clrscr;randomize;
    sum :=0; N:=24; tem:=0;
    writeln ( 'Pembangkitan ',N );
    writeln ( '=====');
    writeln ( 'No. B R   Data ');
    writeln ( '=====');
    for I:=1 to N do
      begin
        U := Random;
        if (u>=0.000) and (u<=0.032) then
          Begin Sum := Sum + P1; tem := p1; end;
        if (u>=0.033) and (u<=0.061) then
          Begin Sum := Sum + P2; tem := p2; end;
        if (u>=0.062) and (u<=0.127) then
          Begin Sum := Sum + P3; tem := p3; end;
        if (u>=0.128) and (u<=0.174) then
          Begin Sum := Sum + P4; tem := p4; end;
        if (u>=0.175) and (u<=0.188) then
          Begin Sum := Sum + P5; tem := p5; end;
        if (u>=0.189) and (u<=0.213) then
          Begin Sum := Sum + P6; tem := p6; end;
        if (u>=0.214) and (u<=0.215) then
          Begin Sum := Sum + P7; tem := p7; end;
        if (u>=0.216) and (u<=0.225) then
          Begin Sum := Sum + P8; tem := p8; end;
      end
    end
  end
end

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if (u>=0.226) and (u<=0.353) then
Begin Sum := Sum + P9; tem := p9; end;
if (u>=0.354) and (u<=0.475) then
Begin Sum := Sum + P10; tem := p10; end;
if (u>=0.476) and (u<=0.526) then
Begin Sum := Sum + P11; tem := p11; end;
if (u>=0.527) and (u<=0.583) then
Begin Sum := Sum + P12; tem := p12; end;
if (u>=0.584) and (u<=0.613) then
Begin Sum := Sum + P13; tem := p13; end;
if (u>=0.614) and (u<=0.616) then
Begin Sum := Sum + P14; tem := p14; end;
if (u>=0.617) and (u<=0.619) then
Begin Sum := Sum + P15; tem := p15; end;
if (u>=0.620) and (u<=0.646) then
Begin Sum := Sum + P16; tem := p16; end;
if (u>=0.647) and (u<=0.656) then
Begin Sum := Sum + P17; tem := p17; end;
if (u>=0.657) and (u<=0.746) then
Begin Sum := Sum + P18; tem := p18; end;
if (u>=0.747) and (u<=0.883) then
Begin Sum := Sum + P19; tem := p19; end;
if (u>=0.884) and (u<=0.946) then
Begin Sum := Sum + P20; tem := p20; end;
if (u>=0.947) and (u<=0.966) then
Begin Sum := Sum + P21; tem := p21; end;
if (u>=0.967) and (u<=0.981) then
Begin Sum := Sum + P22; tem := p22; end;
if (u>=0.982) and (u<=0.990) then
Begin Sum := Sum + P23; tem := p23; end;
if (u>=0.991) and (u<=0.999) then
Begin Sum := Sum + P24; tem := p24; end;
  writeln (I, '          ', u:7:3, '          ', tem);
      Rata:= Sum / I;
  begin
    readln;
    clrscr;
  end;
end;
writeln ( '=====');
writeln ( 'Rata:', Rata:7:3 );readln;
end;
end.

```

## CONTOH HASIL PEMBANGKITAN BILANGAN RANDOM

| Pembangkitan 51 |       |      | Pembangkitan 52 |       |      | Pembangkitan 53 |       |      | Pembangkitan 54 |       |      | Pembangkitan 55 |       |      |
|-----------------|-------|------|-----------------|-------|------|-----------------|-------|------|-----------------|-------|------|-----------------|-------|------|
| No              | B R   | Data | No              | B R   | Data | No              | B R   | Data | No              | B R   | Data | No              | B R   | Data |
| 1               | 0.538 | 88   | 1               | 0.821 | 210  | 1               | 0.986 | 13   | 1               | 0.167 | 72   | 1               | 0.643 | 22   |
| 2               | 0.054 | 44   | 2               | 0.599 | 46   | 2               | 0.214 | 3    | 2               | 0.864 | 210  | 2               | 0.26  | 197  |
| 3               | 0.464 | 188  | 3               | 0.194 | 39   | 3               | 0.389 | 188  | 3               | 0.675 | 139  | 3               | 0.575 | 88   |
| 4               | 0.364 | 188  | 4               | 0.24  | 197  | 4               | 0.249 | 197  | 4               | 0.335 | 197  | 4               | 0.692 | 139  |
| 5               | 0.571 | 88   | 5               | 0.181 | 22   | 5               | 0.585 | 46   | 5               | 0.926 | 97   | 5               | 0.029 | 50   |
| 6               | 0.792 | 210  | 6               | 0.614 | 5    | 6               | 0.965 | 30   | 6               | 0.195 | 39   | 6               | 0.173 | 72   |
| 7               | 0     | 50   | 7               | 0.189 | 39   | 7               | 0.613 | 46   | 7               | 0     | 50   | 7               | 0.605 | 46   |
| 8               | 0.709 | 139  | 8               | 0.396 | 188  | 8               | 0.93  | 97   | 8               | 0.683 | 139  | 8               | 0.918 | 97   |
| 9               | 0.224 | 15   | 9               | 0.618 | 5    | 9               | 0.649 | 22   | 9               | 0.951 | 30   | 9               | 0.375 | 188  |
| 10              | 0.263 | 197  | 10              | 0.626 | 36   | 10              | 0.899 | 97   | 10              | 0.486 | 79   | 10              | 0.794 | 210  |
| 11              | 0.988 | 13   | 11              | 0.221 | 15   | 11              | 0.619 | 5    | 11              | 0.178 | 22   | 11              | 0.845 | 210  |
| 12              | 0.257 | 197  | 12              | 0.224 | 15   | 12              | 0.215 | 3    | 12              | 0.111 | 102  | 12              | 0.061 | 44   |
| 13              | 0.595 | 46   | 13              | 0.185 | 22   | 13              | 0.224 | 15   | 13              | 0.974 | 23   | 13              | 0.594 | 46   |
| 14              | 0.666 | 139  | 14              | 0.296 | 197  | 14              | 0.133 | 72   | 14              | 0.135 | 72   | 14              | 0.636 | 36   |
| 15              | 0.632 | 36   | 15              | 0.178 | 22   | 15              | 0.643 | 22   | 15              | 0.536 | 88   | 15              | 0.449 | 188  |
| 16              | 0.892 | 97   | 16              | 0.121 | 102  | 16              | 0.214 | 3    | 16              | 0.623 | 36   | 16              | 0.181 | 22   |
| 17              | 0.327 | 197  | 17              | 0.178 | 22   | 17              | 0.553 | 88   | 17              | 0.28  | 197  | 17              | 0.504 | 79   |
| 18              | 0.268 | 197  | 18              | 0.603 | 46   | 18              | 0.101 | 102  | 18              | 0.152 | 72   | 18              | 0.268 | 197  |
| 19              | 0.618 | 5    | 19              | 0.968 | 23   | 19              | 0.191 | 39   | 19              | 0.215 | 3    | 19              | 0.952 | 30   |
| 20              | 0.89  | 97   | 20              | 0.215 | 3    | 20              | 0.329 | 197  | 20              | 0.091 | 102  | 20              | 0.336 | 197  |
| 21              | 0.602 | 46   | 21              | 0.959 | 30   | 21              | 0.215 | 3    | 21              | 0.634 | 22   | 21              | 0.095 | 102  |
| 22              | 0.438 | 188  | 22              | 0.141 | 72   | 22              | 0.618 | 5    | 22              | 0.903 | 97   | 22              | 0.898 | 97   |
| 23              | 0.177 | 22   | 23              | 0.047 | 44   | 23              | 0.001 | 50   | 23              | 0.836 | 210  | 23              | 0.151 | 72   |
| 24              | 0.896 | 97   | 24              | 0.641 | 36   | 24              | 0.34  | 197  | 24              | 0.155 | 72   | 24              | 0.278 | 197  |
| Rata : 107.667  |       |      | Rata : 59.833   |       |      | Rata : 64.166   |       |      | Rata : 90.4167  |       |      | Rata : 109.417  |       |      |
| Pembangkitan 56 |       |      | Pembangkitan 57 |       |      | Pembangkitan 58 |       |      | Pembangkitan 59 |       |      | Pembangkitan 60 |       |      |
| No              | B R   | Data | No              | B R   | Data | No              | B R   | Data | No              | B R   | Data | No              | B R   | Data |
| 1               | 0.488 | 79   | 1               | 0.173 | 72   | 1               | 0.55  | 88   | 1               | 0.593 | 46   | 1               | 0.348 | 197  |
| 2               | 0.214 | 3    | 2               | 0.656 | 22   | 2               | 0.983 | 13   | 2               | 0.578 | 88   | 2               | 0.616 | 5    |
| 3               | 0.688 | 139  | 3               | 0.649 | 22   | 3               | 0.783 | 210  | 3               | 0.869 | 210  | 3               | 0.078 | 102  |
| 4               | 0.621 | 36   | 4               | 0.383 | 188  | 4               | 0.095 | 102  | 4               | 0.437 | 97   | 4               | 0.647 | 22   |
| 5               | 0.703 | 139  | 5               | 0.507 | 79   | 5               | 0.998 | 14   | 5               | 0.71  | 139  | 5               | 0.708 | 139  |
| 6               | 0.203 | 39   | 6               | 0.651 | 22   | 6               | 0.09  | 102  | 6               | 0.617 | 5    | 6               | 0.968 | 23   |
| 7               | 0.618 | 5    | 7               | 0.93  | 97   | 7               | 0.362 | 188  | 7               | 0.53  | 88   | 7               | 0.992 | 14   |
| 8               | 0.299 | 197  | 8               | 0.104 | 102  | 8               | 0.671 | 139  | 8               | 0.396 | 188  | 8               | 0.872 | 210  |
| 9               | 0.618 | 5    | 9               | 0.115 | 102  | 9               | 0.661 | 139  | 9               | 0.215 | 3    | 9               | 0.94  | 97   |
| 10              | 0.224 | 15   | 10              | 0.063 | 102  | 10              | 0.42  | 188  | 10              | 0.573 | 88   | 10              | 0.925 | 97   |
| 11              | 0.233 | 197  | 11              | 0.518 | 79   | 11              | 0.251 | 197  | 11              | 0.906 | 97   | 11              | 0.675 | 139  |
| 12              | 0.968 | 23   | 12              | 0.512 | 79   | 12              | 0.928 | 97   | 12              | 0.085 | 102  | 12              | 0.208 | 39   |
| 13              | 0.056 | 44   | 13              | 0.482 | 79   | 13              | 0.825 | 210  | 13              | 0.532 | 88   | 13              | 0.189 | 39   |
| 14              | 0.788 | 210  | 14              | 0.996 | 14   | 14              | 0.651 | 22   | 14              | 0.216 | 15   | 14              | 0.07  | 102  |
| 15              | 0.686 | 139  | 15              | 0.968 | 23   | 15              | 0.551 | 88   | 15              | 0.067 | 102  | 15              | 0.662 | 139  |
| 16              | 0.598 | 46   | 16              | 0.907 | 97   | 16              | 0.247 | 197  | 16              | 0.214 | 3    | 16              | 0.214 | 3    |
| 17              | 0.223 | 15   | 17              | 0.215 | 3    | 17              | 0.162 | 72   | 17              | 0.216 | 15   | 17              | 0.182 | 22   |
| 18              | 0.215 | 3    | 18              | 0.076 | 102  | 18              | 0.94  | 97   | 18              | 0.221 | 15   | 18              | 0.822 | 210  |
| 19              | 0.616 | 5    | 19              | 0.464 | 188  | 19              | 0.104 | 102  | 19              | 0.615 | 15   | 19              | 0.554 | 88   |
| 20              | 0.856 | 210  | 20              | 0.644 | 36   | 20              | 0.25  | 197  | 20              | 0.692 | 139  | 20              | 0.858 | 210  |
| 21              | 0.607 | 46   | 21              | 0.017 | 50   | 21              | 0.707 | 139  | 21              | 0.585 | 46   | 21              | 0.949 | 30   |
| 22              | 0.019 | 50   | 22              | 0.891 | 97   | 22              | 0.185 | 22   | 22              | 0.546 | 88   | 22              | 0.742 | 139  |
| 23              | 0.103 | 102  | 23              | 0.654 | 22   | 23              | 0.147 | 72   | 23              | 0.091 | 102  | 23              | 0.815 | 210  |
| 24              | 0.972 | 23   | 24              | 0.509 | 79   | 24              | 0.626 | 36   | 24              | 0.628 | 36   | 24              | 0.041 | 44   |
| Rata : 73.75    |       |      | Rata : 73.167   |       |      | Rata : 113.792  |       |      | Rata : 75.625   |       |      | Rata : 96.666   |       |      |

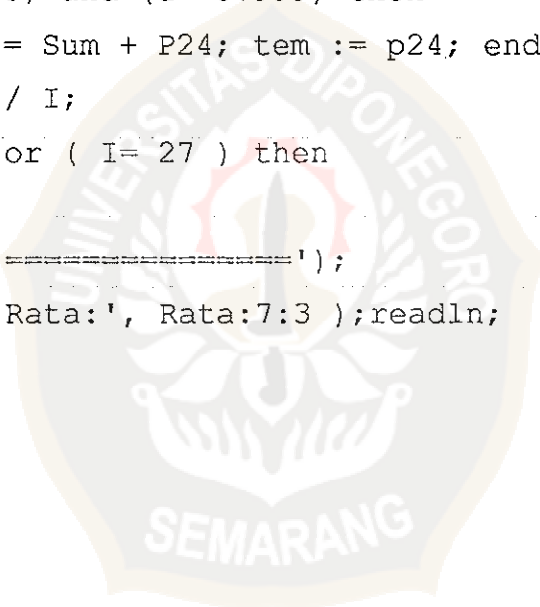
## PROGRAM PEMBANGKITAN BILANGAN RANDOM UNTUK SAMPEL BOOTSTRAP LEVEL II

```

Program Simulasi ( Input, output );
Uses crt;
Var J, P, N, I, Sum, Tem :longint;
    u, Rata: real;
Const p1 = 72 ; p2 = 22 ; p3 = 22 ; p4 = 188; p5 = 79 ; p6 = 22 ;
      p7 = 97 ; p8 = 102; p9 = 102; p10= 102; p11= 79 ; p12= 79 ;
      p13= 79 ; p14= 14 ; p15= 23 ; p16= 97 ; p17= 3 ; p18= 102;
      p19= 188; p20= 36 ; p21= 50 ; p22= 97 ; p23= 22 ; p24= 79 ;
begin
  clrscr;
  for J:=1 to 2 do
    begin
      clrscr;randomize;
      sum :=0; N:=24; tem:=0;
      for I:=1 to N do
        begin
          U := Random;
          if (u>=0.000) and (u<=0.040) then
            Begin Sum := Sum + P1; tem := p1; end;
          if (u>=0.041) and (u<=0.053) then
            Begin Sum := Sum + P2; tem := p2; end;
          if (u>=0.054) and (u<=0.066) then
            Begin Sum := Sum + P3; tem := p3; end;
          if (u>=0.067) and (u<=0.173) then
            Begin Sum := Sum + P4; tem := p4; end;
          if (u>=0.174) and (u<=0.218) then

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if (u>=0.838) and (u<=0.858) then
Begin Sum := Sum + P20; tem := p20; end;
if (u>=0.859) and (u<=0.886) then
Begin Sum := Sum + P21; tem := p21; end;
if (u>=0.887) and (u<=0.941) then
Begin Sum := Sum + P22; tem := p22; end;
if (u>=0.942) and (u<=0.954) then
Begin Sum := Sum + P23; tem := p23; end;
if (u>=0.955) and (u<=0.999) then
Begin Sum := Sum + P24; tem := p24; end;
Rata:= Sum / I;
If ( I=1 ) or ( I= 27 ) then
end;
writeln ( '=====' );
writeln ( 'Rata:', Rata:7:3 );readln;
end;
end.
```



## STATISTIK BOOTSTRAP LEVEL KEDUA

UNTUK N = 100

| j  | $\hat{\theta}^{**}$ |
|----|---------------------|
| 1  | 112.941             |
| 2  | 93.871              |
| 3  | 65.192              |
| 4  | 46.821              |
| 5  | 47.575              |
| 6  | 63.231              |
| 7  | 65.377              |
| 8  | 126.256             |
| 9  | 61.425              |
| 10 | 62.672              |
| 11 | 72.831              |
| 12 | 74.234              |
| 13 | 80.931              |
| 14 | 62.878              |
| 15 | 95.027              |
| 16 | 63.321              |
| 17 | 54.825              |
| 18 | 72.423              |
| 19 | 56.207              |
| 20 | 63.213              |
| 21 | 57.889              |
| 22 | 55.932              |
| 23 | 52.877              |
| 24 | 95.588              |
| 25 | 100.811             |

| j  | $\hat{\theta}^{**}$ |
|----|---------------------|
| 26 | 91.231              |
| 27 | 116.892             |
| 28 | 47.371              |
| 29 | 63.743              |
| 30 | 67.244              |
| 31 | 48.178              |
| 32 | 62.247              |
| 33 | 120.628             |
| 34 | 62.542              |
| 35 | 74.789              |
| 36 | 63.243              |
| 37 | 75.214              |
| 38 | 65.992              |
| 39 | 83.521              |
| 40 | 64.289              |
| 41 | 47.247              |
| 42 | 113.841             |
| 43 | 92.777              |
| 44 | 62.787              |
| 45 | 46.811              |
| 46 | 64.223              |
| 47 | 62.243              |
| 48 | 120.002             |
| 49 | 63.113              |
| 50 | 73.541              |

| j  | $\hat{\theta}^{**}$ |
|----|---------------------|
| 51 | 74.354              |
| 52 | 81.921              |
| 53 | 63.787              |
| 54 | 93.207              |
| 55 | 62.252              |
| 56 | 56.899              |
| 57 | 74.249              |
| 58 | 57.208              |
| 59 | 63.234              |
| 60 | 56.911              |
| 61 | 57.832              |
| 62 | 54.787              |
| 63 | 94.554              |
| 64 | 105.882             |
| 65 | 90.132              |
| 66 | 115.211             |
| 67 | 48.732              |
| 68 | 62.432              |
| 69 | 49.782              |
| 70 | 63.24               |
| 71 | 121.286             |
| 72 | 62.427              |
| 73 | 63.254              |
| 74 | 75.879              |
| 75 | 64.432              |

| j   | $\hat{\theta}^{**}$ |
|-----|---------------------|
| 76  | 74.142              |
| 77  | 63.981              |
| 78  | 82.214              |
| 79  | 63.871              |
| 80  | 112.742             |
| 81  | 49.998              |
| 82  | 93.982              |
| 83  | 63.781              |
| 84  | 48.222              |
| 85  | 65.123              |
| 86  | 61.143              |
| 87  | 121.241             |
| 88  | 62.201              |
| 89  | 63.817              |
| 90  | 82.291              |
| 91  | 73.543              |
| 92  | 72.451              |
| 93  | 94.208              |
| 94  | 61.251              |
| 95  | 57.287              |
| 96  | 72.492              |
| 97  | 58.807              |
| 98  | 62.201              |
| 99  | 56.281              |
| 100 | 58.382              |