A Mini Project Report

On

**STEAM TABLE**

Submitted in partial fulfillment of requirements for the Course
CSE18R272 - JAVA PROGRAMMING

**Bachelor's of Technology**

In

**Computer Science and Engineering**

Submitted By


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# ABSTRACT

Stream tables may be an effective way to learn about watersheds and the dynamic processes, factors, and landforms within. We review the copious stream table literature, present new ideas for assembling stream tables, and provide a watershed approach to stream table exercises. Our stream table's compact size and low cost permits the purchase and use of multiple units to maximize active learning. The included stream table modules allow introductory students to experiment and observe the effects of factors–i.e., climate (Module A–Precipitation, Overland Flow, and Channel Initiation and Module B–Stream Discharge and Channel Formation), topography (Module C–Watershed Topography and Channel Formation), land cover (Module D–Watershed Cover Types and Channel Formation), and base level (Module E–Local Base Level Changes via Dams and Reservoirs) –on fluvial processes and landforms in a watershed. Course evaluations and exams show that students enjoy the stream table exercise more, and learn the concepts of fluvial geomorphology better, than via traditional topographic map and aerial photograph interpretation exercises.

# DECLARATION

I hereby declare that the work presented in this report entitled "**STREAM TABLES**", in partial fulfilment of the requirements for the course CSE18R272-Java Programming and submitted in **Department of Computer Science and Engineering, Kalasalingam Academy of Research and Education** (**Deemed to be University**) is an authentic record of our own work carried out during the period from **Jan 2020** under the guidance of Mr. **Dr. R. Ramalakshmi** (Associate Professor).

The work reported in this has not been submitted by me for the award of any other degree of this or any other institute.


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# Chapter 1

# INTRODUCTION

Watersheds (i.e., drainage basins or catchments) are the most basic of landscape-scale units (Sutherland, 1994). Watershed-based environmental issues increasingly impact our daily lives–e.g., witness the recent listings of anadromous fish as threatened and endangered, and the resulting impacts of these listings on land use in the Pacific Northwest of the United States. A clear understanding of the functions of watersheds, and the factors that influence them, is therefore essential to understanding contemporary environmental issues. However, the large areas, often subtle boundaries, and complex interaction of geomorphic factors (substrate, climate, land cover, topography, time, base level, and human activity), geomorphic processes (fluvial erosion, transportation, and deposition), and landforms within make watersheds difficult to comprehend (Figure 1). Watersheds are commonly addressed in introductory physical geography, environmental science, earth science, and geology courses within sections on the hydrologic cycle and fluvial geomorphology. Instructors in such courses often attempt to link dynamic fluvial factors, processes, and landforms to watersheds with traditional lectures, and with topographic map- and airphoto-based laboratory exercises. Students subsequently may struggle to understand how fluvial landscapes evolve over time and how fluvial processes and factors affect everyday lives. This problem is especially acute when the vast majority of students enrolled in introductory courses are non-science majors. Thus, the question explored here is how may scientists and non-scientists better learn about the interrelated, dynamic fluvial factors, processes, and landforms of watersheds? A potential solution to these problems is to use stream tables as watershed education tools. Stream tables (also referred to as "earth sculpture tanks" (Balchin and Richards, 1952), "erosion beds" (Haigh and Kilmartin, 1987), "erosion tables" (Hubbell, 1964), "erosion trays" (Tolman and Morton, 1986), "flumes" (Yoxall, 1983), "model rivers" (Chapman and Wilcox, 1983), "sand tables" (Joseph and others, 1964), "sand trays" (Joseph and others, 1964), "sedimentation tanks" (Larsen, 1968), "stream models" (DeSeyn, 1973), "stream tanks" (Anderson, 1969), and "stream troughs" (Lewis, 1944)) are sediment-filled troughs through which water flows to provide a laboratory model of a stream or stream system within a watershed. The dynamic interaction between the stream table's flowing water and sediment enables students to observe and experiment with the most important of the geomorphic agents in shaping Earth's surface–fluvial processes (Bloom, 1998). While the use of stream tables is not a new idea, it is one worth revisiting, especially in light of the recent emphasis on "student-centered" (Gold and others, 1991) or "active learning" (Meyers and Jones, 1993) classroom methods. This paper reviews the existing stream table literature and presents new ideas for assembling watershed-emulating stream tables. Additionally, it provides new approaches for watershed-based stream exercises aimed at introductory university-level students but with potential for use by kindergartners to advanced-level college students. The ultimate goal is to encourage educators to further design and use stream tables in their classrooms and laboratories.

# Chapter 2

# PROJECT DESCRIPTION

## Packages Used:

**java.awt.*;**

**java.awt.event.*;(Event Handling);**

## User Defined Packages:

**import java.StreamTables.Pressure;**

**import java.StreamTables.Temperature;**

It is mainly used in Mechanical Engineering.Here We have to give the temperature or pressure value based on the users choice.After that the user need to select wheather he is entered temperature or pressure value.By clicking on the button the corresponding values is shown in the same tab below.Based on the values the user may get helful for solving problems.

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SATURATED STEAM - PRESSURE TABLE

| | | Spec. vol. $m^3$=kg | | Int. Ener. kJ/kg | | Enthalpy kJ/kg | | Entropy kJ=(kg°K) | |
|---|---|---|---|---|---|---|---|---|---|
| P bar | T °C | Sat. liq. $v_f$ X1000 | Sat. vap. $v_g$ | Sat. liq. $u_f$ | Sat. vap. $u_g$ | Sat. liq. $h_f$ | Sat. vap. $h_g$ | Sat. liq. $s_f$ | Sat. vap. $s_g$ |
| 0.04 | 28.96 | 1.004 | 34.80 | 121.4 | 2415 | 121.4 | 2554 | 0.423 | 8.475 |
| 0.06 | 36.15 | 1.006 | 23.75 | 151.5 | 2425 | 151.5 | 2567 | 0.521 | 8.331 |
| 0.08 | 41.5 | 1.008 | 18.11 | 173.8 | 2432 | 173.8 | 2577 | 0.593 | 8.229 |
| 0.1 | 45.8 | 1.010 | 14.68 | 191.8 | 2438 | 191.8 | 2585 | 0.649 | 8.150 |
| 0.2 | 60.07 | 1.017 | 7.649 | 251.4 | 2457 | 251.4 | 2610 | 0.832 | 7.908 |
| 0.3 | 69.11 | 1.023 | 5.229 | 289.2 | 2468 | 289.2 | 2625 | 0.944 | 7.769 |
| 0.4 | 75.87 | 1.026 | 3.994 | 317.5 | 2477 | 317.6 | 2637 | 1.026 | 7.670 |
| 0.5 | 81.33 | 1.030 | 3.240 | 340.4 | 2484 | 340.5 | 2646 | 1.091 | 7.594 |
| 0.6 | 85.94 | 1.033 | 2.732 | 359.8 | 2490 | 359.9 | 2653 | 1.145 | 7.532 |
| 0.7 | 89.95 | 1.036 | 2.365 | 376.6 | 2494 | 376.7 | 2660 | 1.192 | 7.480 |
| 0.8 | 93.5 | 1.039 | 2.087 | 391.6 | 2499 | 391.7 | 2666 | 1.233 | 7.435 |
| 0.9 | 96.71 | 1.041 | 1.870 | 405.1 | 2503 | 405.1 | 2671 | 1.270 | 7.395 |
| 1 | 99.62 | 1.043 | 1.694 | 417.3 | 2506 | 417.4 | 2675 | 1.303 | 7.359 |
| 1.5 | 111.4 | 1.053 | 1.159 | 466.9 | 2520 | 467.1 | 2694 | 1.434 | 7.223 |
| 2 | 120.2 | 1.061 | 0.886 | 504.5 | 2530 | 504.7 | 2707 | 1.530 | 7.127 |
| 3 | 133.6 | 1.073 | 0.606 | 561.1 | 2544 | 561.5 | 2725 | 1.672 | 6.992 |
| 4 | 143.6 | 1.084 | 0.463 | 604.3 | 2554 | 604.8 | 2739 | 1.777 | 6.896 |
| 5 | 151.9 | 1.093 | 0.375 | 639.7 | 2561 | 640.2 | 2749 | 1.861 | 6.821 |
| 6 | 158.9 | 1.101 | 0.316 | 669.9 | 2567 | 670.6 | 2757 | 1.931 | 6.760 |
| 7 | 165.0 | 1.108 | 0.273 | 696.4 | 2573 | 697.2 | 2764 | 1.992 | 6.708 |
| 8 | 170.4 | 1.115 | 0.240 | 720.2 | 2577 | 721.1 | 2769 | 2.046 | 6.663 |
| 9 | 175.4 | 1.121 | 0.215 | 741.8 | 2580 | 742.8 | 2774 | 2.095 | 6.623 |
| 10 | 179.9 | 1.127 | 0.194 | 761.7 | 2584 | 762.8 | 2778 | 2.139 | 6.586 |
| 20 | 212.4 | 1.177 | 0.100 | 906.4 | 2600 | 908.8 | 2800 | 2.447 | 6.341 |
| 30 | 233.9 | 1.217 | 0.067 | 1005 | 2604 | 1008 | 2804 | 2.646 | 6.187 |
| 40 | 250.4 | 1.252 | 0.050 | 1082 | 2602 | 1087 | 2801 | 2.796 | 6.070 |
| 50 | 264.0 | 1.286 | 0.039 | 1148 | 2597 | 1154 | 2794 | 2.920 | 5.973 |
| 60 | 275.6 | 1.319 | 0.032 | 1205 | 2590 | 1213 | 2784 | 3.027 | 5.889 |
| 70 | 285.9 | 1.352 | 0.027 | 1258 | 2580 | 1267 | 2772 | 3.121 | 5.813 |
| 80 | 295.1 | 1.384 | 0.024 | 1306 | 2570 | 1317 | 2758 | 3.207 | 5.743 |
| 90 | 303.4 | 1.418 | 0.021 | 1350 | 2558 | 1363 | 2742 | 3.286 | 5.677 |
| 100 | 311.1 | 1.453 | 0.018 | 1393 | 2545 | 1408 | 2725 | 3.360 | 5.614 |
| 110 | 318.2 | 1.489 | 0.016 | 1434 | 2530 | 1450 | 2706 | 3.429 | 5.553 |
| 120 | 324.8 | 1.527 | 0.014 | 1473 | 2513 | 1491 | 2685 | 3.496 | 5.492 |
| 130 | 331.0 | 1.567 | 0.013 | 1511 | 2496 | 1532 | 2662 | 3.561 | 5.432 |
| 140 | 336.8 | 1.611 | 0.012 | 1549 | 2477 | 1571 | 2638 | 3.623 | 5.372 |
| 150 | 342.3 | 1.658 | 0.010 | 1586 | 2456 | 1611 | 2611 | 3.685 | 5.310 |
| 160 | 347.4 | 1.711 | 0.009 | 1623 | 2432 | 1650 | 2581 | 3.746 | 5.246 |
| 170 | 352.4 | 1.770 | 0.008 | 1660 | 2405 | 1690 | 2547 | 3.808 | 5.178 |
| 180 | 357.0 | 1.839 | 0.008 | 1699 | 2375 | 1732 | 2510 | 3.871 | 5.105 |
| 190 | 361.5 | 1.924 | 0.007 | 1740 | 2338 | 1776 | 2465 | 3.938 | 5.024 |
| 200 | 365.8 | 2.036 | 0.006 | 1786 | 2295 | 1826 | 2411 | 4.013 | 4.931 |
| 220.9 | 374.1 | 3.155 | 0.003 | 2030 | 2029 | 2099 | 2099 | 4.430 | 4.430 |

Figure 2.1: PRESSURE TABLE

## 12.4 Steam Tables

SATURATED STEAM - TEMPERATURE TABLE

| | | Spec. vol. $m^3$=kg | | Int. Ener. kJ/kg | | Enthalpy kJ/kg | | Entropy kJ=(kg°K) | |
|---|---|---|---|---|---|---|---|---|---|
| T °C | P bar | Sat. liq. $v_f$ X1000 | Sat. vap. $v_g$ | Sat. liq. $u_f$ | Sat. vap. $u_g$ | Sat. liq. $h_f$ | Sat. vap. $h_g$ | Sat. liq. $s_f$ | Sat. vap. $s_g$ |
| 0.01 | 0.0061 | 1.0002 | 206.1 | 0.01 | 2376 | 0.01 | 2501 | 0 | 9.156 |
| 4 | 0.0081 | 1.0001 | 157.2 | 16.79 | 2381 | 16.79 | 2509 | 0.061 | 9.051 |
| 5 | 0.0087 | 1.0001 | 147.1 | 21.00 | 2383 | 21 | 2511 | 0.0762 | 9.026 |
| 6 | 0.0093 | 1.0001 | 137.7 | 25.21 | 2384 | 25.21 | 2512 | 0.0912 | 9.000 |
| 8 | 0.0107 | 1.0001 | 120.9 | 33.61 | 2387 | 33.61 | 2516 | 0.1212 | 8.950 |
| 10 | 0.0123 | 1.0001 | 106.4 | 42.01 | 2389 | 42.01 | 2520 | 0.151 | 8.901 |
| 11 | 0.0131 | 1.0007 | 99.86 | 46.19 | 2391 | 46.19 | 2522 | 0.1658 | 8.876 |
| 12 | 0.0140 | 1.0007 | 93.79 | 50.40 | 2392 | 50.4 | 2523 | 0.1806 | 8.852 |
| 13 | 0.0150 | 1.0007 | 88.13 | 54.59 | 2393 | 54.59 | 2525 | 0.1953 | 8.828 |
| 14 | 0.0160 | 1.0007 | 82.85 | 58.80 | 2394 | 58.8 | 2527 | 0.2099 | 8.805 |
| 15 | 0.0170 | 1.0007 | 77.93 | 62.99 | 2396 | 62.99 | 2529 | 0.2245 | 8.781 |
| 16 | 0.0182 | 1.0013 | 73.34 | 67.17 | 2397 | 67.17 | 2531 | 0.239 | 8.758 |
| 17 | 0.0194 | 1.0013 | 69.05 | 71.36 | 2399 | 71.36 | 2533 | 0.2535 | 8.735 |
| 18 | 0.0206 | 1.0013 | 65.04 | 75.57 | 2400 | 75.57 | 2534 | 0.2679 | 8.712 |
| 19 | 0.0220 | 1.0013 | 61.30 | 79.76 | 2401 | 79.76 | 2536 | 0.2823 | 8.690 |
| 20 | 0.0234 | 1.002 | 57.79 | 83.94 | 2403 | 83.94 | 2538 | 0.2966 | 8.667 |
| 21 | 0.0249 | 1.002 | 54.52 | 88.13 | 2404 | 88.13 | 2540 | 0.3108 | 8.645 |
| 22 | 0.0264 | 1.002 | 51.45 | 92.32 | 2406 | 92.32 | 2542 | 0.3251 | 8.623 |
| 23 | 0.0281 | 1.0026 | 48.58 | 96.50 | 2407 | 96.5 | 2544 | 0.3392 | 8.601 |
| 24 | 0.0298 | 1.0026 | 45.89 | 100.7 | 2409 | 100.7 | 2545 | 0.3533 | 8.579 |
| 25 | 0.0317 | 1.0032 | 43.36 | 104.9 | 2410 | 104.9 | 2547 | 0.3673 | 8.558 |
| 26 | 0.0336 | 1.0032 | 41.00 | 109.0 | 2411 | 109.0 | 2549 | 0.3814 | 8.537 |
| 27 | 0.0357 | 1.0032 | 38.78 | 113.2 | 2412 | 113.2 | 2551 | 0.3953 | 8.515 |
| 28 | 0.0378 | 1.0038 | 36.69 | 117.4 | 2414 | 117.4 | 2553 | 0.4093 | 8.495 |
| 29 | 0.0401 | 1.0038 | 34.73 | 121.6 | 2415 | 121.6 | 2554 | 0.4231 | 8.474 |
| 30 | 0.0425 | 1.0045 | 32.90 | 125.8 | 2416 | 125.8 | 2556 | 0.4369 | 8.453 |
| 31 | 0.0450 | 1.0045 | 31.17 | 130.0 | 2418 | 130.0 | 2558 | 0.4507 | 8.433 |
| 32 | 0.0476 | 1.0051 | 29.54 | 134.1 | 2419 | 134.1 | 2560 | 0.4644 | 8.413 |
| 33 | 0.0503 | 1.0051 | 28.01 | 138.3 | 2421 | 138.3 | 2562 | 0.478 | 8.393 |
| 34 | 0.0532 | 1.0057 | 26.57 | 142.5 | 2422 | 142.5 | 2563 | 0.4917 | 8.373 |
| 35 | 0.0563 | 1.0057 | 25.22 | 146.7 | 2423 | 146.7 | 2565 | 0.5053 | 8.353 |
| 36 | 0.0595 | 1.0063 | 23.94 | 150.8 | 2425 | 150.8 | 2567 | 0.5188 | 8.333 |
| 38 | 0.0663 | 1.007 | 21.60 | 159.2 | 2427 | 159.2 | 2571 | 0.5457 | 8.295 |
| 40 | 0.0738 | 1.0076 | 19.52 | 167.5 | 2430 | 167.5 | 2574 | 0.5725 | 8.257 |
| 45 | 0.0959 | 1.010 | 15.26 | 188.4 | 2437 | 188.4 | 2583 | 0.6386 | 8.165 |
| 50 | 0.1235 | 1.012 | 12.03 | 209.3 | 2443 | 209.3 | 2592 | 0.7037 | 8.076 |
| 55 | 0.1576 | 1.015 | 9.569 | 230.2 | 2450 | 230.2 | 2601 | 0.7679 | 7.991 |
| 60 | 0.1994 | 1.017 | 7.671 | 251.1 | 2457 | 251.1 | 2610 | 0.8311 | 7.910 |
| 65 | 0.2503 | 1.020 | 6.197 | 272.0 | 2463 | 272.0 | 2618 | 0.8934 | 7.831 |
| 70 | 0.3119 | 1.023 | 5.042 | 293.0 | 2470 | 293.0 | 2627 | 0.9549 | 7.755 |
| 75 | 0.3858 | 1.026 | 4.131 | 313.9 | 2476 | 313.9 | 2635 | 1.016 | 7.682 |
| 80 | 0.4739 | 1.029 | 3.407 | 334.8 | 2482 | 334.9 | 2644 | 1.075 | 7.612 |

Figure 2.2: TEMPERATURE TABLE

1012 CHAPTER 12. SUPPLEMENTAL MATERIALS

SATURATED STEAM - TEMPERATURE TABLE (Continued)

| | | Spec. vol. $m^3$=kg | | Int. Ener. kJ/kg | | Enthalpy kJ/kg | | Entropy kJ=(kg°K) | |
|---|---|---|---|---|---|---|---|---|---|
| T °C | P bar | Sat. liq. $v_f$ X1000 | Sat. vap. $v_g$ | Sat. liq. $u_f$ | Sat. vap. $u_g$ | Sat. liq. $h_f$ | Sat. vap. $h_g$ | Sat. liq. $s_f$ | Sat. vap. $s_g$ |
| 85 | 0.5783 | 1.033 | 2.828 | 355.8 | 2488 | 355.9 | 2652 | 1.134 | 7.544 |
| 90 | 0.7013 | 1.036 | 2.361 | 376.8 | 2494 | 376.9 | 2660 | 1.193 | 7.479 |
| 95 | 0.8455 | 1.039 | 1.982 | 397.9 | 2501 | 398.0 | 2668 | 1.250 | 7.416 |
| 100 | 1.013 | 1.044 | 1.673 | 418.9 | 2507 | 419.0 | 2676 | 1.307 | 7.355 |
| 110 | 1.433 | 1.052 | 1.21 | 461.1 | 2518 | 461.3 | 2691 | 1.418 | 7.239 |
| 120 | 1.985 | 1.060 | 0.892 | 503.5 | 2529 | 503.7 | 2706 | 1.528 | 7.130 |
| 130 | 2.701 | 1.069 | 0.669 | 546.0 | 2540 | 546.3 | 2720 | 1.634 | 7.027 |
| 140 | 3.613 | 1.080 | 0.509 | 588.7 | 2550 | 589.1 | 2734 | 1.739 | 6.930 |
| 150 | 4.758 | 1.091 | 0.393 | 631.7 | 2559 | 632.2 | 2746 | 1.842 | 6.838 |
| 160 | 6.178 | 1.102 | 0.307 | 674.9 | 2568 | 675.5 | 2758 | 1.943 | 6.750 |
| 170 | 7.916 | 1.114 | 0.243 | 718.3 | 2576 | 719.2 | 2769 | 2.042 | 6.666 |
| 180 | 10.02 | 1.127 | 0.194 | 762.1 | 2584 | 763.2 | 2778 | 2.140 | 6.586 |
| 190 | 12.54 | 1.141 | 0.157 | 806.2 | 2589 | 807.6 | 2786 | 2.236 | 6.508 |
| 200 | 15.54 | 1.156 | 0.127 | 850.6 | 2596 | 852.4 | 2793 | 2.331 | 6.432 |
| 210 | 19.06 | 1.172 | 0.104 | 895.5 | 2600 | 897.8 | 2798 | 2.425 | 6.358 |
| 220 | 23.18 | 1.190 | 0.086 | 940.8 | 2603 | 943.6 | 2802 | 2.518 | 6.286 |
| 230 | 27.95 | 1.209 | 0.072 | 986.7 | 2603 | 990.1 | 2804 | 2.610 | 6.215 |
| 240 | 33.44 | 1.229 | 0.06 | 1033 | 2603 | 1037.3 | 2804 | 2.702 | 6.144 |
| 250 | 39.73 | 1.251 | 0.05 | 1080 | 2603 | 1085.3 | 2802 | 2.793 | 6.073 |
| 260 | 46.88 | 1.275 | 0.042 | 1128 | 2600 | 1134.4 | 2797 | 2.884 | 6.002 |
| 270 | 54.98 | 1.302 | 0.036 | 1177 | 2592 | 1184.5 | 2790 | 2.975 | 5.930 |
| 280 | 64.11 | 1.332 | 0.03 | 1227 | 2587 | 1236.0 | 2780 | 3.067 | 5.857 |
| 290 | 74.36 | 1.365 | 0.026 | 1279 | 2573 | 1289.0 | 2766 | 3.159 | 5.782 |
| 300 | 85.81 | 1.403 | 0.022 | 1332 | 2560 | 1344.0 | 2749 | 3.253 | 5.704 |
| 320 | 112.7 | 1.499 | 0.015 | 1445 | 2531 | 1461.5 | 2700 | 3.448 | 5.536 |
| 340 | 145.9 | 1.638 | 0.011 | 1570 | 2462 | 1594.1 | 2622 | 3.659 | 5.336 |
| 360 | 186.5 | 1.893 | 0.007 | 1725 | 2351 | 1760.5 | 2481 | 3.915 | 5.053 |
| 374.14 | 220.9 | 3.155 | 0.003155 | 2030 | 2030 | 2099.3 | 2099 | 4.430 | 4.430 |

Figure 2.3: TEMPERATURE TABLE CONTINUED

### 2.0.1 SCREENSHOT OUTPUT

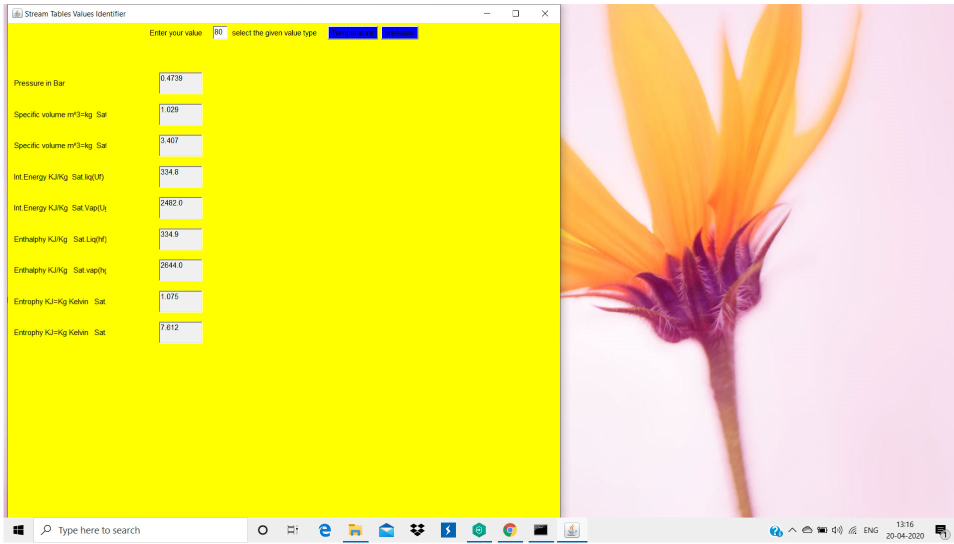


Figure 2.4: SCREEN SHOT OF OUTPUT

# Chapter 3

# CONCLUSION

The stream table and modules (or slight variations thereof) described above have been used for four semesters (total of 15 laboratory sections) in an introductory physical geography laboratory at Drake University. The inexpensive stream tables allow teams of two to four students to isolate the various factors affecting watershed streams and observe the resulting geomorphic processes and landforms. The laboratory also requires that students integrate what they learn throughout the physical geography course–i.e., meteorology, climatology, hydrology, biogeography, pedology, and geomorphology. Students are also encouraged to experiment on their own. Indeed, student experimentation resulted in the development of Module E: Base Level via Dams and Reservoirs. Ultimately, students learn that: watersheds and floodplains are dynamic over space and time; a variety of factors influence these dynamic places; changes in any one of the factors results in different fluvial processes; and different fluvial processes lead to the development of a variety of landforms. The lab experiments and associated questions are successful in helping students tie the “experimental world” of the stream table to the “real world”, an important goal noted by Exline (1975). This goal may be further enhanced by modeling the laboratory watersheds after local watersheds that students may visit during a subsequent laboratory session. Maps of the local watershed may be incorporated into the exercise as can questions relating the local watershed to the model watershed

# Appendices

**SOURCE CODE**

```
package StreamTables;
public class Pressure
{
  double p[][]={
                {0.04  ,28.96  ,1.004  ,34.80  ,121.4  ,2415
                    ↪   ,121.4, 2554, 0.423, 8.475},
                {0.06  ,36.15, 1.006, 23.75, 151.5, 2425
                    ↪   ,151.5, 2567, 0.521, 8.331},
                {0.08, 41.5  ,1.008  ,18.11  ,173.8  ,2432,
                    ↪  173.8, 2577  ,0.593, 8.229},
                {0.1  ,45.8, 1.010, 14.68, 191.8, 2438,
                    ↪ 191.8, 2585, 0.649, 8.150},
                {0.2  ,60.07, 1.017, 7.649, 251.4  ,2457
                    ↪ ,251.4  ,2610  ,0.832  ,7.908},
                {0.3  ,69.11, 1.023, 5.229  ,289.2  ,2468
                    ↪ ,289.2  ,2625  ,0.944  ,7.769},
                {0.4  ,75.87  ,1.026, 3.994  ,317.5  ,2477
                    ↪ ,317.6  ,2637  ,1.026  ,7.670},
                {0.5  ,81.33  ,1.030  ,3.240  ,340.4  ,2484
                    ↪ ,340.5  ,2646  ,1.091  ,7.594},
                {0.6  ,85.94  ,1.033  ,2.732  ,359.8  ,2490
                    ↪ ,359.9  ,2653  ,1.145  ,7.532},
                {0.7  ,89.95  ,1.036  ,2.365  ,376.6  ,2494
                    ↪ ,376.7  ,2660  ,1.192  ,7.480},
                {0.8  ,93.5  ,1.039  ,2.087  ,391.6  ,2499
                    ↪ ,391.7  ,2666  ,1.233  ,7.435},
                {0.9  ,96.71  ,1.041  ,1.870, 405.1  ,2503
                    ↪ ,405.1  ,2671  ,1.270  ,7.395},
                {1  ,99.62  ,1.043  ,1.694  ,417.3  ,2506
                    ↪ ,417.4  ,2675  ,1.303  ,7.359},
                {1.5, 111.4  ,1.053  ,1.159  ,466.9  ,2520
                    ↪ ,467.1  ,2694  ,1.434  ,7.223},
                {2  ,120.2  ,1.061  ,0.886  ,504.5  ,2530
                    ↪ ,504.7  ,2707  ,1.530  ,7.127},
                {3  ,133.6  ,1.073  ,0.606  ,561.1  ,2544
                    ↪ ,561.5  ,2725  ,1.672  ,6.992},
                {4  ,143.6  ,1.084  ,0.463  ,604.3  ,2554
                    ↪ ,604.8  ,2739  ,1.777  ,6.896},
```

```
{5 ,151.9 ,1.093 ,0.375 ,639.7 ,2561
   ↪ ,640.2 ,2749 ,1.861 ,6.821},
{6 ,158.9 ,1.101 ,0.316 ,669.9 ,2567
   ↪ ,670.6 ,2757 ,1.931 ,6.760},
{7 ,165.0 ,1.108 ,0.273 ,696.4 ,2573
   ↪ ,697.2 ,2764 ,1.992 ,6.708},
{8, 170.4 ,1.115 ,0.240 ,720.2 ,2577
   ↪ ,721.1 ,2769 ,2.046 ,6.663},
{9 ,175.4 ,1.121 ,0.215 ,741.8 ,2580
   ↪ ,742.8 ,2774 ,2.095 ,6.623},
{10 ,179.9 ,1.127 ,0.194 ,761.7 ,2584
   ↪ ,762.8 ,2778 ,2.139 ,6.586},
{20 ,212.4 ,1.177 ,0.100 ,906.4 ,2600
   ↪ ,908.8 ,2800 ,2.447 ,6.341},
{30 ,233.9 ,1.217 ,0.067 ,1005 ,2604
   ↪ ,1008 ,2804 ,2.646 ,6.187},
{40 ,250.4 ,1.252 ,0.050 ,1082 ,2602
   ↪ ,1087 ,2801 ,2.796 ,6.070},
{50, 264.0 ,1.286 ,0.039 ,1148 ,2597
   ↪ ,1154 ,2794 ,2.920 ,5.973},
{60 ,275.6 ,1.319 ,0.032 ,1205 ,2590
   ↪ ,1213 ,2784 ,3.027 ,5.889},
{70 ,285.9 ,1.352 ,0.027 ,1258 ,2580
   ↪ ,1267 ,2772 ,3.121 ,5.813},
{80 ,295.1 ,1.384 ,0.024 ,1306 ,2570
   ↪ ,1317 ,2758 ,3.207 ,5.743},
{90 ,303.4 ,1.418 ,0.021 ,1350, 2558
   ↪ ,1363 ,2742 ,3.286 ,5.677},
{100 ,311.1 ,1.453 ,0.018 ,1393 ,2545
   ↪ ,1408 ,2725 ,3.360 ,5.614},
{110 ,318.2 ,1.489 ,0.016 ,1434 ,2530
   ↪ ,1450 ,2706 ,3.429 ,5.553},
{120 ,324.8 ,1.527 ,0.014 ,1473 ,2513
   ↪ ,1491 ,2685 ,3.496 ,5.492},
{130 ,331.0 ,1.567 ,0.013 ,1511 ,2496
   ↪ ,1532 ,2662 ,3.561 ,5.432},
{140 ,336.8 ,1.611 ,0.012 ,1549 ,2477
   ↪ ,1571 ,2638 ,3.623 ,5.372},
{150 ,342.3 ,1.658 ,0.010 ,1586 ,2456
   ↪ ,1611 ,2611 ,3.685 ,5.310},
```

```
                {160 ,347.4 ,1.711 ,0.009 ,1623 ,2432
                    ↪ ,1650 ,2581 ,3.746 ,5.246},
                {170 ,352.4 ,1.770 ,0.008 ,1660 ,2405
                    ↪ ,1690 ,2547 ,3.808 ,5.178},
                {180 ,357.0 ,1.839 ,0.008 ,1699 ,2375
                    ↪ ,1732 ,2510 ,3.871 ,5.105},
                {190 ,361.5 ,1.924 ,0.007 ,1740 ,2338
                    ↪ ,1776 ,2465 ,3.938 ,5.024},
                {200 ,365.8 ,2.036 ,0.006 ,1786 ,2295
                    ↪ ,1826 ,2411 ,4.013 ,4.931},
                {220.9, 374.1 ,3.155 ,0.003 ,2030 ,2029
                    ↪  ,2099, 2099 ,4.430 ,4.430},
              };
 int i,j,k=1;
 public double[] findpressureval(int pre)
 {
   double a[]=new double[9];
   for(i=0;i<=42;i++)
   {
     if(p[i][0]==pre)
     {
                for(j=0;j<9;j++)
                {
                  while(k<10)
                   {
                     a[j]= p[i][k];
                          k++;
                          break;
                   }
                }
        }
     }
     return a;
  }
}
```

```
package StreamTables;
import java.util.*;
public class Temperature
{
```

```
double t[][]={
              {0.01  ,0.0061, 1.0002  ,206.1  ,0.01
                ↪ ,2376  ,0.01, 2501, 0  ,9.156},
              {4  ,0.0081  ,1.0001  ,157.2  ,16.79  ,2381
                ↪ ,16.79  ,2509  ,0.061  ,9.051},
              {5  ,0.0087  ,1.0001  ,147.1  ,21.00  ,2383,
                ↪  21, 2511, 0.0762, 9.026},
              {6, 0.0093, 1.0001, 137.7  ,25.21, 2384,
                ↪  25.21, 2512, 0.0912, 9.000},
              {8  ,0.0107  ,1.0001, 120.9, 33.61  ,2387
                ↪ ,33.61, 2516  ,0.1212, 8.950},
              {10, 0.0123, 1.0001, 106.4, 42.01,
                ↪ 2389, 42.01, 2520, 0.151, 8.901},
              {11, 0.0131, 1.0007, 99.86, 46.19,
                ↪ 2391, 46.19, 2522  ,0.1658,
                ↪ 8.876},
              {12, 0.0140, 1.0007, 93.79, 50.40,
                ↪ 2392, 50.4, 2523, 0.1806, 8.852},
              {13  ,0.0150  ,1.0007  ,88.13  ,54.59  ,2393
                ↪  ,54.59  ,2525  ,0.1953  ,8.828},
              {14  ,0.0160, 1.0007  ,82.85  ,58.80,
                ↪ 2394, 58.8, 2527  ,0.2099, 8.805},
              {15, 0.0170  ,1.0007  ,77.93  ,62.99  ,2396
                ↪  ,62.99  ,2529  ,0.2245  ,8.781},
              {16, 0.0182, 1.0013, 73.34, 67.17,
                ↪ 2397, 67.17, 2531, 0.239, 8.758},
              {17  ,0.0194  ,1.0013  ,69.05  ,71.36  ,2399
                ↪  ,71.36  ,2533  ,0.2535  ,8.735},
              {18  ,0.0206, 1.0013, 65.04  ,75.57,
                ↪ 2400, 75.57  ,2534  ,0.2679,
                ↪ 8.712},
              {19  ,0.0220  ,1.0013  ,61.30  ,79.76  ,2401
                ↪  ,79.76  ,2536  ,0.2823  ,8.690},
              {20  ,0.0234, 1.002, 57.79, 83.94, 2403,
                ↪  83.94, 2538  ,0.2966, 8.667},
              {21  ,0.0249  ,1.002  ,54.52  ,88.13  ,2404
                ↪ ,88.13  ,2540  ,0.3108  ,8.645},
              {22  ,0.0264, 1.002, 51.45, 92.32, 2406,
                ↪  92.32, 2542, 0.3251, 8.623},
              {23  ,0.0281  ,1.0026  ,48.58  ,96.50  ,2407
```

```
    ↪  ,96.5 ,2544 ,0.3392 ,8.601},
{24 ,0.0298, 1.0026, 45.89, 100.7, 2409
    ↪  ,100.7, 2545, 0.3533, 8.579},
{25 ,0.0317 ,1.0032 ,43.36 ,104.9 ,2410
    ↪  ,104.9 ,2547 ,0.3673 ,8.558},
{26 ,0.0336 ,1.0032, 41.00, 109.0,
    ↪ 2411, 109.0, 2549, 0.3814,
    ↪ 8.537},
{27 ,0.0357 ,1.0032 ,38.78 ,113.2 ,2412
    ↪  ,113.2 ,2551 ,0.3953 ,8.515},
{28 ,0.0378 ,1.0038, 36.69, 117.4,
    ↪ 2414, 117.4, 2553, 0.4093,
    ↪ 8.495},
{29 ,0.0401 ,1.0038 ,34.73 ,121.6,
    ↪ 2415, 121.6, 2554 ,0.4231,
    ↪ 8.474},
{30 ,0.0425 ,1.0045, 32.90 ,125.8,
    ↪ 2416, 125.8, 2556, 0.4369,
    ↪ 8.453},
{31 ,0.0450 ,1.0045 ,31.17 ,130.0 ,2418
    ↪  ,130.0 ,2558 ,0.4507 ,8.433},
{32 ,0.0476 ,1.0051 ,29.54 ,134.1 ,2419
    ↪  ,134.1, 2560 ,0.4644, 8.413},
{33 ,0.0503 ,1.0051 ,28.01 ,138.3 ,2421
    ↪  ,138.3 ,2562 ,0.478, 8.393},
{34 ,0.0532, 1.0057, 26.57, 142.5,
    ↪ 2422, 142.5, 2563 ,0.4917,
    ↪ 8.373},
{35 ,0.0563 ,1.0057 ,25.22 ,146.7 ,2423
    ↪  ,146.7 ,2565 ,0.5053 ,8.353},
{36 ,0.0595 ,1.0063, 23.94, 150.8,
    ↪ 2425, 150.8, 2567 ,0.5188,
    ↪ 8.333},
{38 ,0.0663 ,1.007 ,21.60 ,159.2 ,2427
    ↪ ,159.2 ,2571 ,0.5457 ,8.295},
{40 ,0.0738, 1.0076 ,19.52 ,167.5,
    ↪ 2430, 167.5, 2574, 0.5725,
    ↪ 8.257},
{45 ,0.0959 ,1.010 ,15.26 ,188.4 ,2437,
    ↪  188.4 ,2583 ,0.6386 ,8.165},
```

```
{50 ,0.1235, 1.012 ,12.03 ,209.3, 2443,
   ↪  209.3, 2592 ,0.7037, 8.076},
{55 ,0.1576 ,1.015, 9.569, 230.2, 2450
   ↪ ,230.2 ,2601 ,0.7679 ,7.991},
{60 ,0.1994 ,1.017 ,7.671 ,251.1 ,2457
   ↪ ,251.1 ,2610 ,0.8311 ,7.910},
{65 ,0.2503 ,1.020 ,6.197 ,272.0 ,2463
   ↪ ,272.0 ,2618 ,0.8934 ,7.831},
{70 ,0.3119 ,1.023 ,5.042 ,293.0 ,2470
   ↪ ,293.0 ,2627 ,0.9549 ,7.755},
{75 ,0.3858 ,1.026 ,4.131 ,313.9 ,2476
   ↪ ,313.9 ,2635 ,1.016 ,7.682},
{80 ,0.4739 ,1.029 ,3.407 ,334.8 ,2482
   ↪ ,334.9 ,2644 ,1.075 ,7.612},
{85 ,0.5783, 1.033 ,2.828 ,355.8 ,2488
   ↪ ,355.9 ,2652 ,1.134 ,7.544},
{90 ,0.7013, 1.036 ,2.361 ,376.8 ,2494
   ↪ ,376.9 ,2660 ,1.193 ,7.479},
{95 ,0.8455 ,1.039 ,1.982 ,397.9 ,2501
   ↪ ,398.0 ,2668 ,1.250 ,7.416},
{100 ,1.013 ,1.044 ,1.673 ,418.9 ,2507
   ↪ ,419.0 ,2676 ,1.307 ,7.355},
{110 ,1.433 ,1.052 ,1.21 ,461.1 ,2518
   ↪ ,461.3 ,2691 ,1.418 ,7.239},
{120 ,1.985 ,1.060 ,0.892 ,503.5 ,2529
   ↪ ,503.7 ,2706 ,1.528 ,7.130},
{130 ,2.701 ,1.069 ,0.669 ,546.0 ,2540
   ↪ ,546.3 ,2720 ,1.634 ,7.027},
{140 ,3.613 ,1.080 ,0.509 ,588.7 ,2550
   ↪ ,589.1 ,2734 ,1.739 ,6.930},
{150 ,4.758 ,1.091 ,0.393 ,631.7 ,2559
   ↪ ,632.2 ,2746 ,1.842 ,6.838},
{160 ,6.178 ,1.102 ,0.307 ,674.9 ,2568
   ↪ ,675.5 ,2758 ,1.943 ,6.750},
{170 ,7.916 ,1.114 ,0.243 ,718.3 ,2576
   ↪ ,719.2 ,2769 ,2.042 ,6.666},
{180 ,10.02 ,1.127 ,0.194 ,762.1 ,2584
   ↪ ,763.2 ,2778 ,2.140 ,6.586},
{190 ,12.54 ,1.141 ,0.157 ,806.2 ,2589
   ↪ ,807.6 ,2786 ,2.236 ,6.508},
```

```
                {200 ,15.54 ,1.156 ,0.127 ,850.6 ,2596
                   ↪ ,852.4 ,2793 ,2.331 ,6.432},
                {210 ,19.06 ,1.172 ,0.104 ,895.5 ,2600
                   ↪ ,897.8 ,2798 ,2.425 ,6.358},
                {220 ,23.18 ,1.190 ,0.086 ,940.8 ,2603
                   ↪ ,943.6 ,2802 ,2.518 ,6.286},
                {230 ,27.95 ,1.209 ,0.072 ,986.7 ,2603
                   ↪ ,990.1 ,2804 ,2.610 ,6.215},
                {240 ,33.44 ,1.229 ,0.06 ,1033 ,2603
                   ↪ ,1037.3 ,2804 ,2.702 ,6.144},
                {250 ,39.73 ,1.251 ,0.05 ,1080 ,2603
                   ↪ ,1085.3 ,2802 ,2.793 ,6.073},
                {260 ,46.88 ,1.275 ,0.042 ,1128 ,2600
                   ↪ ,1134.4 ,2797 ,2.884 ,6.002},
                {270 ,54.98 ,1.302 ,0.036 ,1177 ,2592
                   ↪ ,1184.5 ,2790 ,2.975 ,5.930},
                {280 ,64.11 ,1.332 ,0.03 ,1227 ,2587
                   ↪ ,1236.0 ,2780 ,3.067 ,5.857},
                {290 ,74.36 ,1.365 ,0.026 ,1279 ,2573
                   ↪ ,1289.0 ,2766 ,3.159 ,5.782},
                {300 ,85.81 ,1.403 ,0.022 ,1332 ,2560
                   ↪ ,1344.0 ,2749 ,3.253 ,5.704},
                {320 ,112.7 ,1.499 ,0.015 ,1445 ,2531
                   ↪ ,1461.5 ,2700 ,3.448 ,5.536},
                {340 ,145.9 ,1.638 ,0.011 ,1570 ,2462
                   ↪ ,1594.1 ,2622 ,3.659 ,5.336},
                {360 ,186.5 ,1.893 ,0.007 ,1725 ,2351
                   ↪ ,1760.5 ,2481 ,3.915 ,5.053},
                {374.14, 220.9 ,3.155 ,0.003155 ,2030
                   ↪ ,2030 ,2099.3 ,2099 ,4.430,
                   ↪ 4.430},
               };
    int i,j,k=1;
    public double[] findtempval(int tem)
     {
      double a[]=new double[9];
      for(i=0;i<=69;i++)
      {
          if(t[i][0]==tem)
          {
```

```
                for(j=0;j<9;j++)
                {
                  while(k<10)
                   {
                     a[j]= t[i][k];
                        k++;
                        break;
                   }
                }
         }

       }

        return a;
    }
}
```

```
import java.awt.*;
import java.awt.event.*;
import java.util.Arrays;
import StreamTables.Temperature;
import StreamTables.Pressure;
class Temperaturepressval extends Frame implements
   ↪ ActionListener
{
  TextField tf1,tf2,tf3,tf4,tf5,tf6,tf7,tf8,tf9,tf10;
  Button b1,b2;
  Temperature t;
  Pressure p;
  Label l1,l2,l3,l4,l5,l6,l7,l8,l9,l10,l11;
  Temperaturepressval()
  {
    super("Stream Tables Values Identifier");
    l1=new Label("Enter your value");
    l1.setBounds(15,10,125,35);
    tf1=new TextField();
    tf1.setBounds(250,10,70,35);
    l2=new Label("select the given value type");
    l2.setBounds(15,60,180,35);
    b1=new Button("Temperature");
```

```
  b1.setBackground(Color.blue);
  b2=new Button("pressure");
  b2.setBackground(Color.blue);
  b1.addActionListener(this);
  b2.addActionListener(this);
  tf2=new TextField();
  tf2.setEditable(false);
  tf2.setBounds(250,110,70,35);
  tf3=new TextField();
  tf3.setEditable(false);
  tf3.setBounds(250,160,70,35);
  tf4=new TextField();
  tf4.setEditable(false);
  tf4.setBounds(250,210,70,35);
  tf5=new TextField();
  tf5.setEditable(false);
  tf5.setBounds(250,260,70,35);
  tf6=new TextField();
  tf6.setEditable(false);
  tf6.setBounds(250,310,70,35);
  tf7=new TextField();
  tf7.setEditable(false);
  tf7.setBounds(250,360,70,35);
  tf8=new TextField();
  tf8.setEditable(false);
  tf8.setBounds(250,410,70,35);
  tf9=new TextField();
  tf9.setEditable(false);
  tf9.setBounds(250,460,70,35);
  tf10=new TextField();
  tf10.setEditable(false);
  tf10.setBounds(250,510,70,35);
  add(l1);  add(tf1); add(l2); add(b1); add(b2);
 setLayout(new FlowLayout());
  setBackground(Color.yellow);
  setForeground(Color.black);
 setSize(900,1100);  setVisible(true);
}
 public void actionPerformed(ActionEvent e)
 {
```

```
String s1=tf1.getText();
int a=Integer.parseInt(s1);
if(e.getSource()==b1)
 {
   t=new Temperature();
  double b[]=t.findtempval(a);
  int size=b.length;
  String str[]=new String[size];
  for(int i=0;i<size;i++)
  {
          str[i]=String.valueOf(b[i]);
  }
  l3=new Label("Pressure␣in␣Bar");
  l3.setBounds(15,110,150,35);
  l4=new Label("Specific␣volume␣m^3=kg␣␣Sat.
     ↪ Liquid(Vf)*1000");
  l4.setBounds(15,160,150,35);
  l5=new Label("Specific␣volume␣m^3=kg␣␣Sat.
     ↪ Vapour(Vg)");
  l5.setBounds(15,210,150,35);
  l6=new Label("Int.Energy␣KJ/Kg␣␣Sat.liq(Uf)");
  l6.setBounds(15,260,150,35);
  l7=new Label("Int.Energy␣KJ/Kg␣␣Sat.Vap(Ug)");
  l7.setBounds(15,310,150,35);
  l8=new Label("Enthalphy␣KJ/Kg␣␣␣Sat.Liq(hf)");
  l8.setBounds(15,360,150,35);
  l9=new Label("Enthalphy␣KJ/Kg␣␣␣Sat.vap(hg)");
  l9.setBounds(15,410,150,35);
  l10=new Label("Entrophy␣KJ=Kg␣Kelvin␣␣␣Sat.Liq(
     ↪ Sf)");
  l10.setBounds(15,460,150,35);
  l11=new Label("Entrophy␣KJ=Kg␣Kelvin␣␣␣Sat.Vap(
     ↪ Sg)" );
  l11.setBounds(15,510,150,35);
  add(l3); tf2.setText(str[0]); add(tf2);
  add(l4);tf3.setText(str[1]); add(tf3);
   add(l5); tf4.setText(str[2]); add(tf4);
  add(l6);tf5.setText(str[3]); add(tf5);
   add(l7); tf6.setText(str[4]); add(tf6);
  add(l8); tf7.setText(str[5]); add(tf7);
```

```
        add(l9); tf8.setText(str[6]); add(tf8);
        add(l10); tf9.setText(str[7]); add(tf9);
        add(l11); tf10.setText(str[8]); add(tf10);
      }
    else if(e.getSource()==b2)
      {
         p=new Pressure();
        double b[]=p.findpressureval(a);
        int size=b.length;
        String str[]=new String[size];
        for(int i=0;i<size;i++)
        {
                str[i]=String.valueOf(b[i]);
        }
        l3=new Label("Temperature in celcius = ");
        l3.setBounds(15,110,300,35);
        l4=new Label("specific volume m^3=Kg   sat.Liq(
            ↪ Vr)*1000 = ");
        l4.setBounds(15,160,300,35);
        l5=new Label("Specific volume m^3=kg    Sat.Vap
            ↪ (Vg) = ");
        l5.setBounds(15,210,300,35);
        l6=new Label("Int.Energy KJ/Kg    Sat.Liq(Ur) =
            ↪  ");
        l6.setBounds(15,260,300,35);
        l7=new Label("Int.Energy KJ/Kg    Sat.vap(Ug) =
            ↪  ");
        l7.setBounds(15,310,300,35);
        l8=new Label("Enthalaphy KJ/Kg    Sat.Liq(hr) =
            ↪  ");
        l8.setBounds(15,360,300,35);
        l9=new Label("Enthalphy KJ/Kg     Sat.Vap(hg) =
            ↪  ");
        l9.setBounds(15,410,300,35);
        l10=new Label("Entrophy KJ=Kg Kelvin    Sat.Liq
            ↪ (sr) = ");
        l10.setBounds(15,460,300,35);
        l11=new Label("Entrophy KJ=Kg Kelvin   Sat.Vap(
            ↪ sg) = ");
        l11.setBounds(15,510,300,35);
```

```
        add(l3); tf2.setText(str[0]); add(tf2);
        add(l4);tf3.setText(str[1]); add(tf3);
         add(l5); tf4.setText(str[2]); add(tf4);
        add(l6);tf5.setText(str[3]); add(tf5);
         add(l7); tf6.setText(str[4]); add(tf6);
        add(l8); tf7.setText(str[5]); add(tf7);
        add(l9); tf8.setText(str[6]); add(tf8);
        add(l10); tf9.setText(str[7]); add(tf9);
        add(l11); tf10.setText(str[8]); add(tf10);
       }
   }
 public static void main(String args[])
 {
   new Temperaturepressval();
 }
}
```